JULY 9, 1960

Chemical Week

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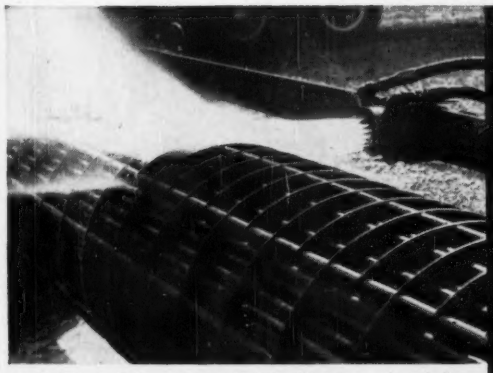
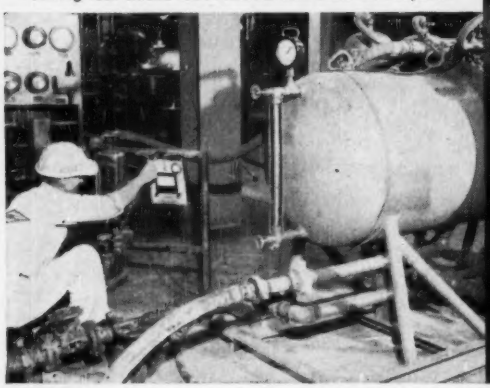


Jetting tool cleans tubes fouled with coke and asphalt.



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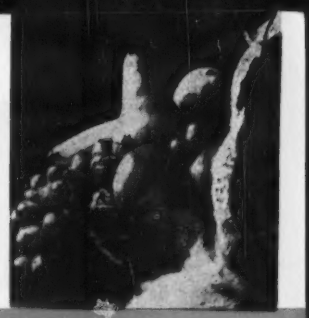

ON THE COVER: Photograph of tempting bowl of fruit and spray-dried additive courtesy of Firmenich Inc,

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Acid Value	203 – 206	200 – 205
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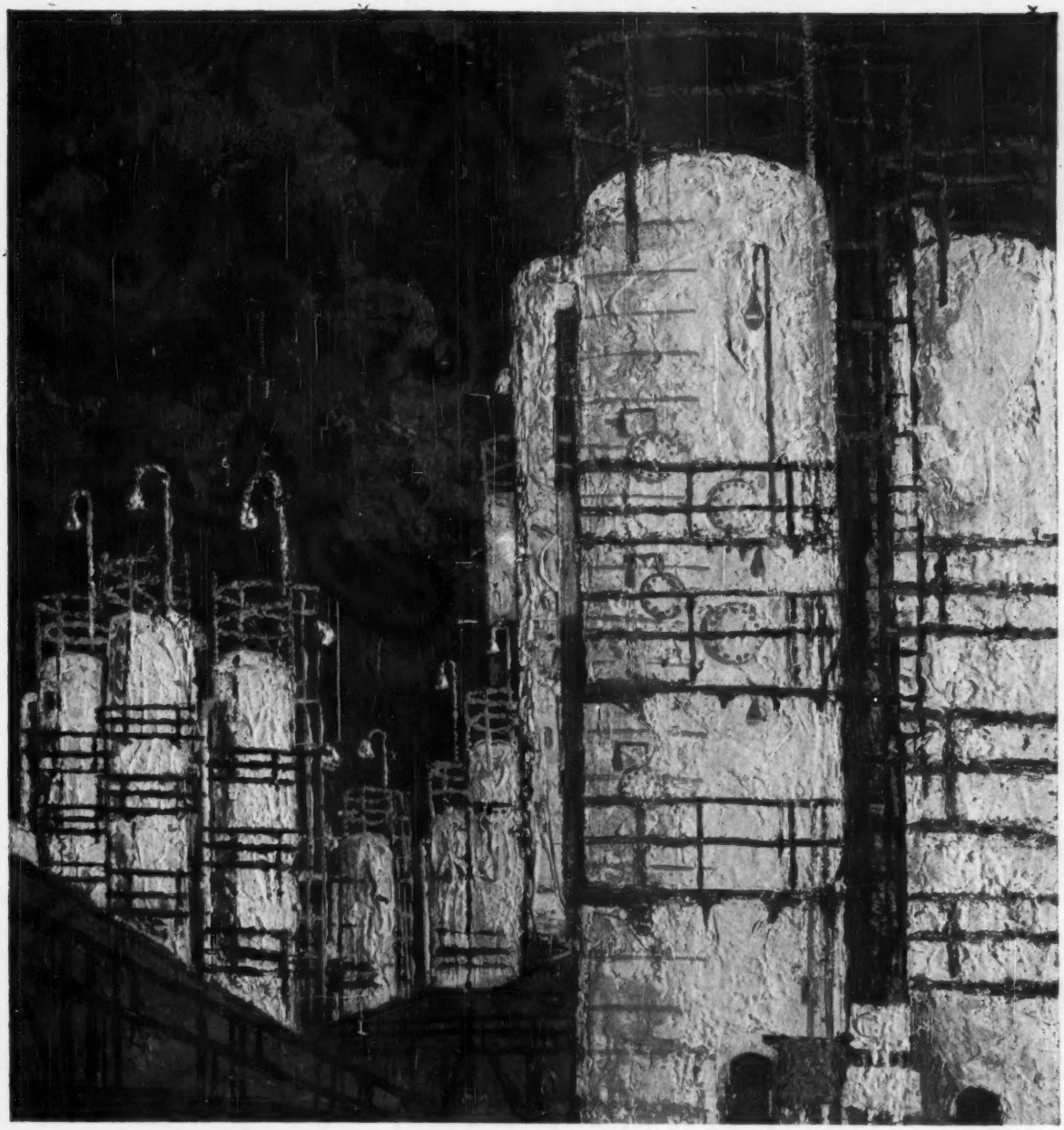

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VIEWPOINT

Tariffs: Reason Plus Self-Interest

"FREE TRADER", "PROTECTIONIST", "MODERATE." These names will be hurled like obscenities as the Tariff Commission and the Committee for Reciprocity Information (CRI) start their concurrent Tariff List open hearings in Washington, Monday, July 11.

Nearly 250 business, industry and labor people—and the chemical process industries are well represented—have swamped officials with briefs and requests to appear. Aim, of course, is to present arguments that might influence, one way or the other, the product lists U.S. representatives will take to the upcoming GATT international tariff negotiations at Geneva, Switzerland, in September.

Washington insiders say that in none of the four previous GATT tariff-cutting sessions since '58 has the response been so overwhelming. As a result the hearings may run a full six weeks. Chemicals and textiles—two of the more import-sensitive industries—are expected to take up to a week each to present their cases against further duty reductions.

Chances are that most of the testimony to be heard during the humid Washington summer will strike sharply at the government's freer-trade approach to the GATT parley. For example, the president of the Synthetic Organic Chemical Manufacturers Assn., Du Pont's Sam Baker, is expected to give the association's views on the over-all economic health of the industries SOCMA is interested in (chemicals, dyes, intermediates, etc.); the impact of import competition under existing rates of duty; the alleged threat of injury to all segments of these interrelated industries; and the necessity for preserving, maintaining and strengthening these industries as "essential to our national defense and security." In addition at least 16 SOCMA member companies will testify individually on specific products or categories.

On the other hand there will be support for the government's position of offering concessions on many items making up the 2,500-item "offer" list in exchange for reductions in tariffs of other countries. A number of briefs presented prior to the filing deadline (June 27) reportedly urge reductions on imports of such divergent products as carbon, plate glass, toys, hardware and precipitated chalk.

Opponents of any further tariff cuts insist that "cheap" foreign goods (partly possible, many say, because of lower wage rates prevailing abroad) have made foreign competition in U.S. markets tough enough without the added encouragement of new tariff concessions.

The basic philosophy behind the "free trade" position is that a free flow of goods maximizes national efficiency of all countries. And the allegation is often made that U.S. businessmen are lagging behind producers in other countries who have awakened to the fact that freer trade is really in their own best interests. Cited as expressions of this new thinking are the European Common Market and the regionalization schemes in Central and South America.

Tariff discussions usually generate more heat than light. We hope that adherents to both sides of the tariff issue will, at the forthcoming open hearings, abandon emotional hysteria for reasoned objectivity. This will improve the odds that Washington will listen. We hope, too, that the U.S. team will approach the international trade conference with this thought: international trade is a two-way street—but there is no stigma attached to considering U.S. interests.

News from
National Carbon Company
Division of Union Carbide Corporation . 270 Park Avenue, New York 17, New York
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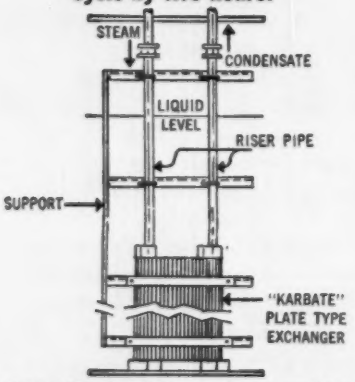
Manager Activated Carbon

H. B. Allport

Mr. Allport was graduated from Case Institute of Technology with a B.S. in Chemical Engineering. He joined National Carbon Company in 1943. Much of his early work in the Chemical Products Group was devoted to designing and improving existing designs of "Karbate" impervious graphite equipment for use in the Chemical Process Industry.

From 1947 to 1950 Mr. Allport was a district engineer in National Carbon Company's Pittsburgh Sales Office. In 1956 he was appointed Manager, Activated Carbon, Chemical Products Marketing.

"Karbate" Plate Heater Installation Reduces Process Cycle by five hours.



Eight "Karbate" impervious graphite plate heaters are used by a plant turning out phospho-organic intermediates for pesticides manufacture. These units (which replaced eight alloy units) are handling a mixture of phosphoric and hydrochloric acid plus organic materials.

With the installation of eight "Karbate" impervious graphite plate heaters the user was able to reduce the production cycle in this application from 19 to 14 hours. It is expected that a modification of the steam piping arrangement will make further savings possible.

"KARBATE" IMPERVIOUS GRAPHITE HEAT EXCHANGERS COMBINE LONG LIFE, CORROSION RESISTANCE AND LOW MAINTENANCE

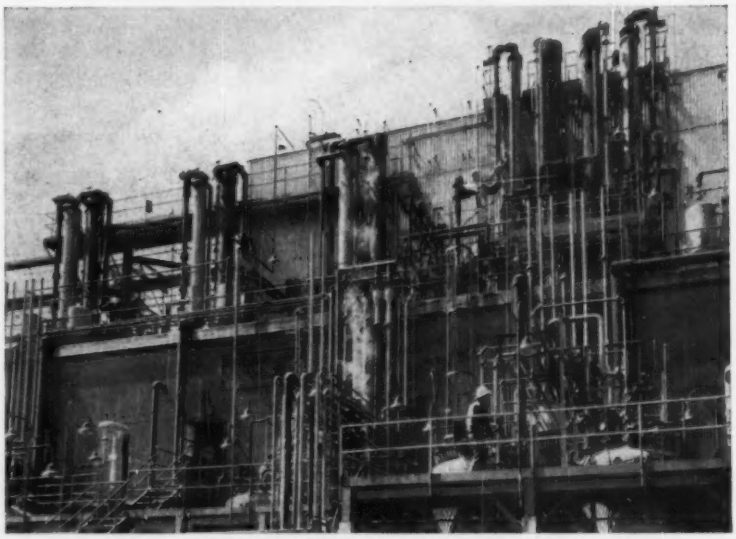


Photo shows a series of "Karbate" shell and tube heat exchangers condensing acid — containing vapors in an organic chemicals plant.

LONG LIFE — "Karbate" Condensers Last 5½ Years Longer Than Metal Units in a Tough Corrosive Service.

The unsurpassed corrosion resistance of "Karbate" impervious graphite makes it an excellent material of construction for shell and tube condensers handling corrosives on both sides. In this service, propylene dichloride with traces of HCl was condensed on the shell side using sea water as the coolant on the tube side.

The condensers have been operating for six years with little maintenance. Metal units in the same service have to be re-tubed about every six months because of excessive corrosion on the active condensing surfaces.

CORROSION RESISTANCE—One "Karbate" Exchanger Does the Work of Two Metal Units.

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Two 110-tube heat exchangers show the low maintenance advantages of "Karbate" impervious graphite material. These units have provided ten years of service concentrating phosphoric acid from 20% to 75%.

Outside of an occasional cleaning, the user says, these units have required little maintenance over this ten year period.

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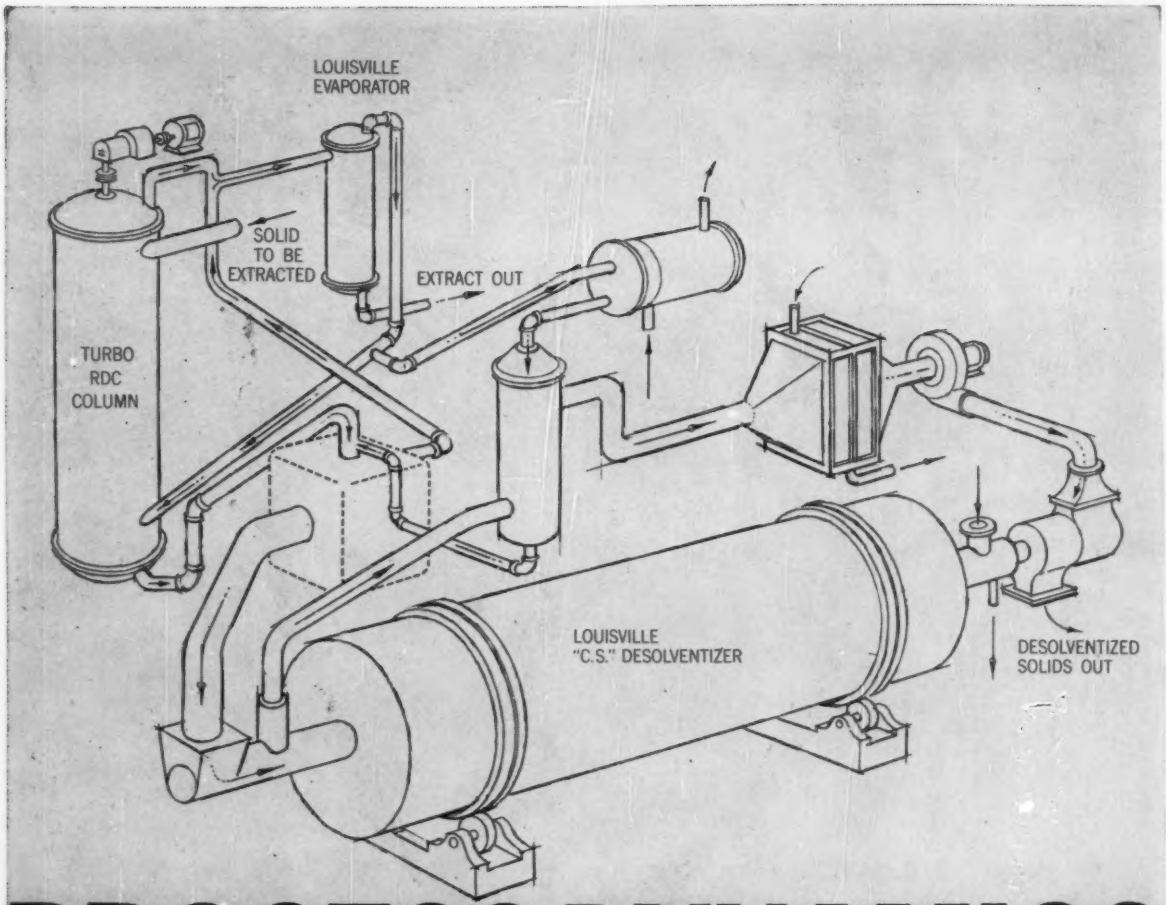

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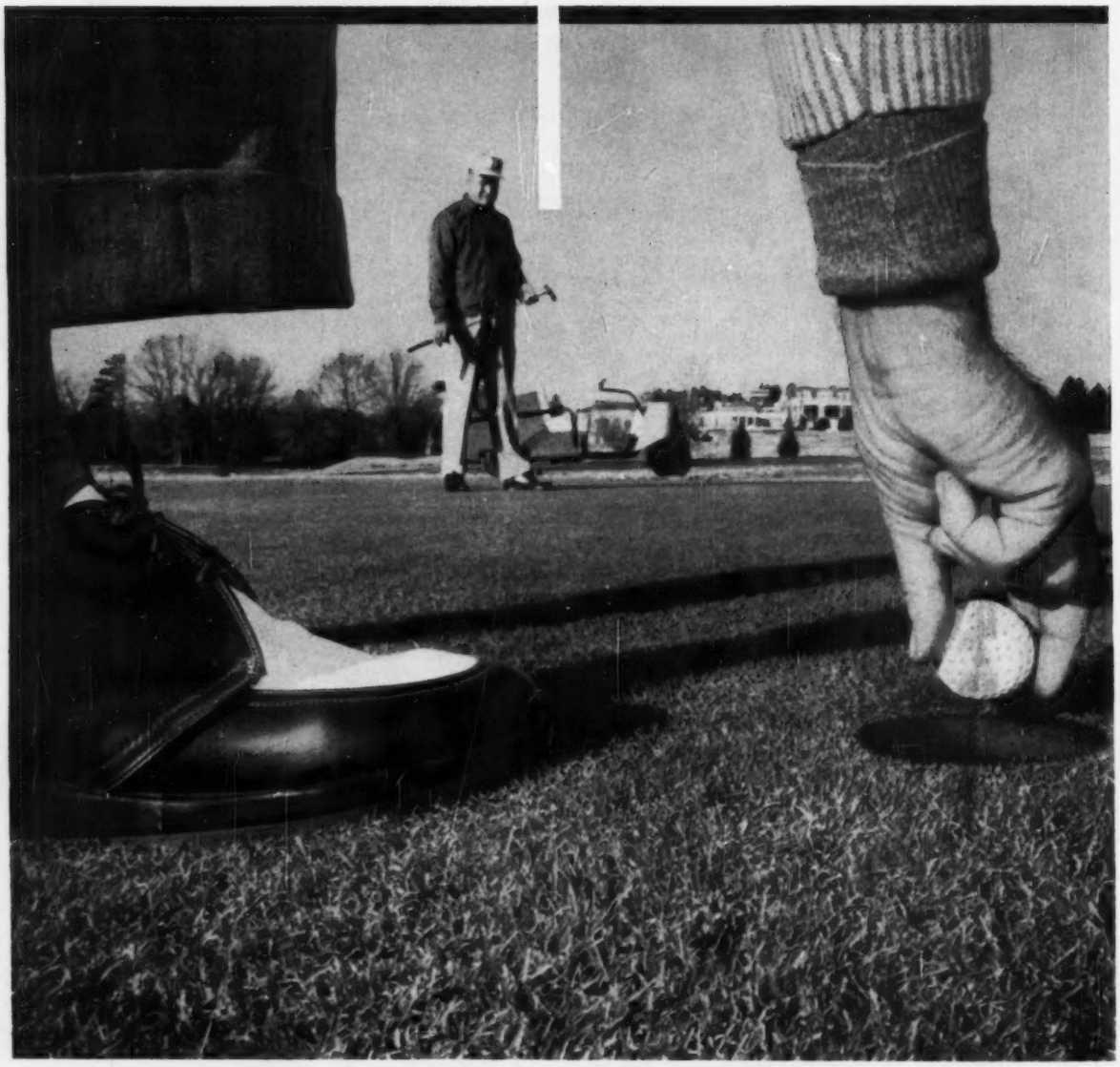

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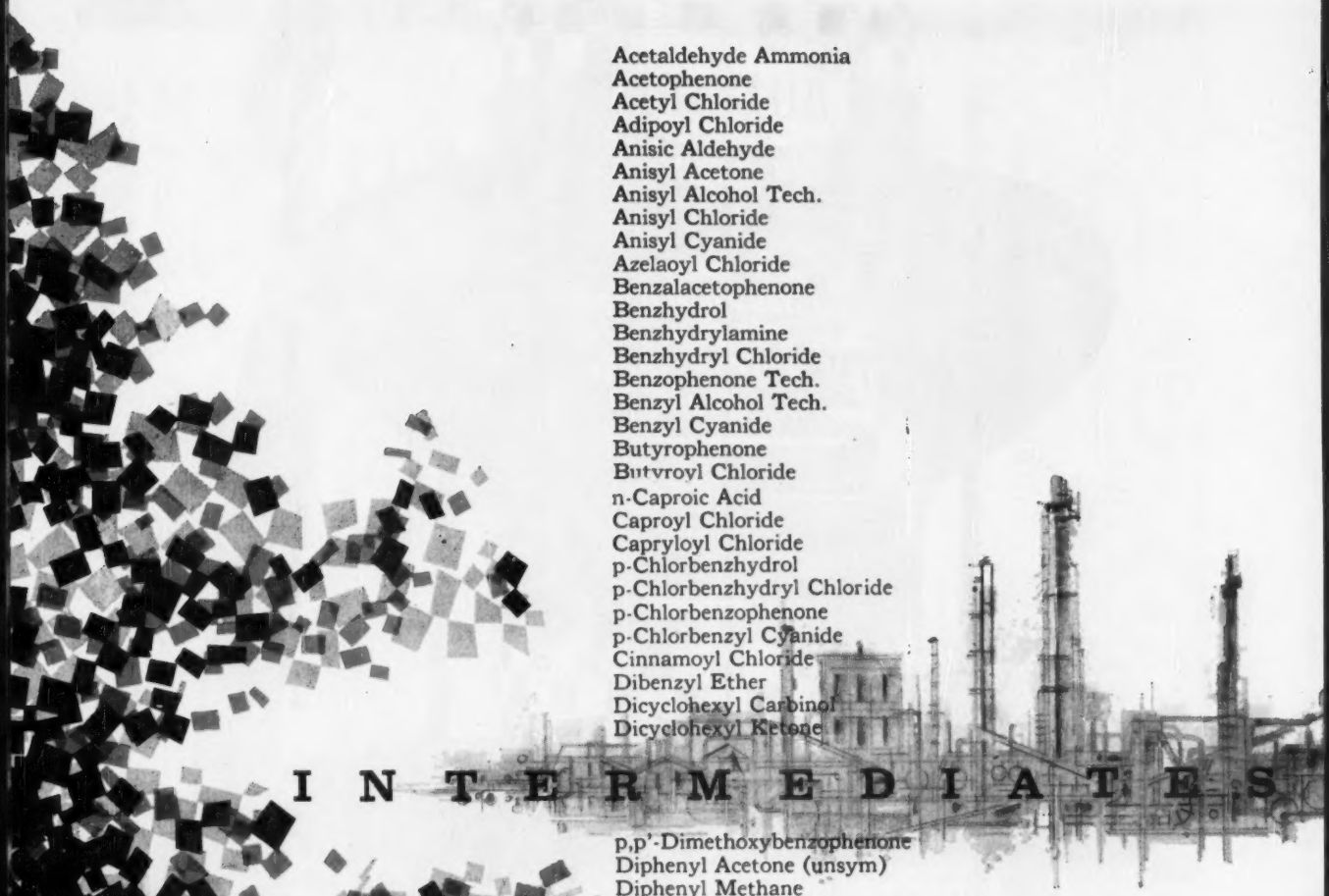

INTERMEDIATES

Acetaldehyde Ammonia
Acetophenone
Acetyl Chloride
Adipoyl Chloride
Anisic Aldehyde
Anisyl Acetone
Anisyl Alcohol Tech.
Anisyl Chloride
Anisyl Cyanide
Azelaoyl Chloride
Benzalacetophenone
Benzhydrol
Benzhydrylamine
Benzhydryl Chloride
Benzophenone Tech.
Benzyl Alcohol Tech.
Benzyl Cyanide
Butyrophenone
Butyroyl Chloride
n-Caproic Acid
Caproyl Chloride
Capryloyl Chloride
p-Chlorbenzhydrol
p-Chlorbenzhydryl Chloride
p-Chlorbenzophenone
p-Chlorbenzyl Cyanide
Cinnamoyl Chloride
Dibenzyl Ether
Dicyclohexyl Carbinol
Dicyclohexyl Ketone
p,p'-Dimethoxybenzophenone
Diphenyl Acetone (unsym)
Diphenyl Methane
Ethyl Formate Tech.
Ethyl Phenylacetate
beta Ionone
Isobutyrophenone
Isobutyroyl Chloride
Isovaleric Acid
Isovaleroyl Chloride
Lauroyl Chloride
p-Methoxy Phenylacetic Acid
Methyl Heptenone
Methyl Phenylacetate
Myristoyl Chloride
Oleoyl Chloride
Palmitoyl Chloride
Pelargonyl Chloride
Phenylacetic Acid
Phenylacetone
Phenylacetyl Chloride
Phenyl Propyl Alcohol
Phenyl Propyl Chloride
Potassium Phenylacetate
Propionyl Chloride
Propiophenone
Sebacoyl Chloride
Sodium Phenylacetate
Stearoyl Chloride
And
Other Intermediates

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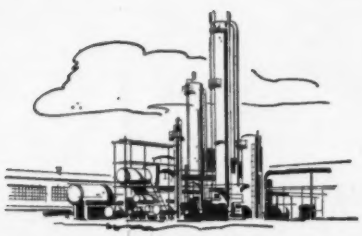

*This statement was contained in an engineer's report concerning the use of CO_2 as a coolant by a company that sulfunates straight chain alcohol. CO_2 sparged directly into the chemicals in the reaction tank, maintains a controlled temperature of -70° F or below. Total time for cooling *55 minutes . . . former time 3 to 4 hours.*

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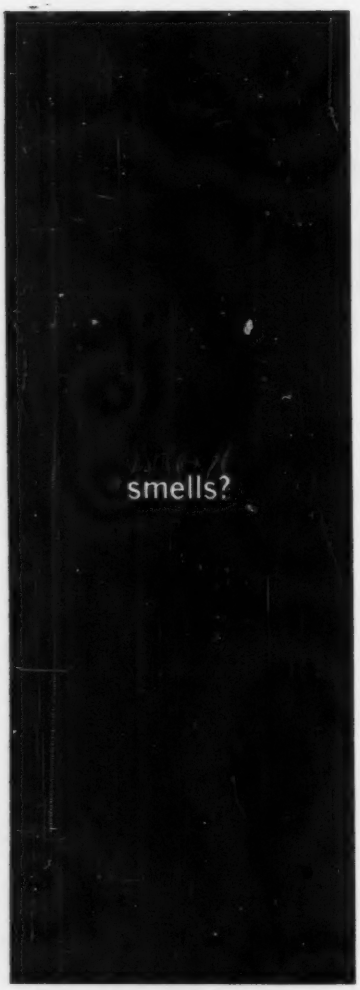

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LETTERS

Engineers Transposed

TO THE EDITOR: I was very much interested in seeing your article concerning Hoechst (*June 18, p. 89*), and I think you ought to be congratulated for putting together a comprehensive story. . . .

I can readily see how you transposed the process groups between Arthur G. McKee & Co. and The Lummus Co. The general field covered by our present agreement with McKee comprises basically the inorganic and fertilizer field, while the corresponding agreement with Lummus covers organic and electrolytical processes. Of course, there is some overlapping. . . .

F. B. GROSSELFINGER
President
Hoechst-Uhde Corp.
New York

Cartographic Chaos

TO THE EDITOR: As a Bucks County resident, I object to your moving the city of Bethlehem to U.S. Highway 611 (*June 18, p. 70*). You are probably going to receive a few complaints from the residents of Easton, which should occupy the position of Bethlehem on the map. However, I am proud to see the accomplishments of the CPI in Bucks County and compliment you on an otherwise fine story. . . .

DENNIS C. GUTHRIE
Eastman Chemical Products, Inc.
New York

Foreign Coverage

TO THE EDITOR: Congratulations on your increased foreign coverage.

There is very little background material for those studying overseas chemical markets, and your increased emphasis in this area will be more than helpful.

ROBERT E. NOYES
Noyes Development Co.
New York

Plastics in Building

TO THE EDITOR: . . . CHEMICAL WEEK gave fine coverage to the public meeting of the Plastics Study Group in connection with the Building Research Institute's spring conferences at New York City April 6-7.

We of the Information Advisory Task Force of the Plastics Study Group feel very strongly that the development of a suitable method of reporting information on plastic material is of the utmost importance to the architect and engineer who must specify these materials in connection with the design of any project. The more publicity that can be given to this type of standard reporting will, of course, be of unestimable value in the construction business. . . .

WILLIAM F. REARDON
General Electric Co.
Schenectady, N.Y.

MEETINGS

Gordon Research Conferences at Colby Junior College, New London, N.H.—July 11-15, textiles; July 18-22, corrosion; July 25-29, separation and purification; Aug. 1-5, instrumentation; Aug. 8-12, food and nutrition; Aug. 15-19, medicinal chemistry; Aug. 22-26, catalysis; Aug. 29-Sept. 2, cancer.

Gordon Research Conferences at New Hampton School, New Hampton, N.H.—July 11-15, statistics in chemistry and chemical engineering; July 18-22, radiation chemistry; July 25-29, organic reactions and processes; Aug. 1-5, steroids and other natural products; Aug. 8-12, organic coatings; Aug. 15-19, analytical chemistry; Aug. 22-26, inorganic chemistry; Aug. 29-Sept. 2, adhesion.

Gordon Research Conferences at Kimball Union Academy, Meriden, N.H.—July 11-15, chemistry, physiology and structure of bones and teeth; July 18-22, high-pressure research; July 25-29, chemistry and metallurgy of semiconductors; Aug. 1-5, solid-state studies in ceramics; Aug. 8-12, chemistry and physics of solids: point defects; Aug. 15-19, toxicology and safety evaluations; Aug. 22-26, infrared spectroscopy; Aug. 29-Sept. 2, high-temperature chemistry: kinetics of vaporization and condensation processes.

Columbia University Industrial Research Conference, Arden House, Harriman, N.Y., Aug. 7-13.

Heat Transfer Conference and Exhibit, Statler-Hilton Hotel, Buffalo, N.Y., Aug. 15-17.

Cryogenic Engineering Conference, University of Colorado, Boulder, Colo., Aug. 22-24.

Technical Assn. of the Pulp and Paper Industry, alkaline pulping conference, Multnomah Hotel, Portland, Ore., Aug. 22-24.

Joint Automatic Control Conference, Massachusetts Institute of Technology, Cambridge, Mass., Sept. 7-9.

isocyanates
1. To build a flexible, high-molecular-weight polymer
Polyoxyalkylene group represented by
2. To prepare filaments with a variety of fiber properties
Block Polymer "A"
Block Polymer "B"
Block Copolymer X — bis-Urethane linkage
3. To crosslink polymers having hydroxyl or other active-hydrogen groups
Polyvinyl Alcohol
Second NCO available for crosslinking.
4. To block undesirable polymer end groups or side chains
Cellulose
Cellulose Triacetate
Cellulose Tricarbamate
5. To impart non-adhering properties
Polyvinyl Alcohol Film. Good adhesion due to polar OH groups.
Non-adhering surface due to loss of polar OH group. The hydrocarbon $C_{18}H_{33}$ has paraffin character, making adhesion difficult. Tendency to crystallize reduced due to bulk of R group, keeping chains apart, and reducing symmetry of polymer molecule.
6. To add biologically-active groups
Biologically Active Urea Derivative

"Mother Lode" for New Product Prospectors

The polyisocyanates are universal "building block" chemicals used to bond together other chemical structures to produce products with built-in, pre-determined characteristics.

For example, flexible resins such as polyether glycols may be joined with a polyisocyanate *to build a flexible, high-molecular-weight polymer* (1). Or, by simply replacing the polyether with a polyester resin, a more rigid product results.

Certain block polymers may be joined to each other with isocyanates *to prepare filaments with a variety of fiber properties* (2).

Using diisocyanates *to crosslink polymers having hydroxyl or other active-hydrogen groups* increases modulus, melting point, temperature and solvent resistance in the end product (3). Reduced sensitivity to water swelling and shrinkage in materials such as wool may also be realized.

The mono-isocyanates may be used to block undesirable polymer end groups or side chains. The substitution of a urethane group for a hydroxyl influences the hydrophilic character of the polymer, its solubility and degree of hydrogen bonding that takes place. Isocyanate modification of cellulose, for example, gives results similar to the conversion to cellulose acetate (4).

Mono-isocyanates can also be used to add hydrophobic groups, *to impart non-adhering properties, to reduce crystallization tendencies of polymers* (5) and *to add biologically-active groups* (6).

Mobay manufactures a broad range of mono-functional and poly-functional isocyanates of both the aromatic and aliphatic type. If you would like to explore further the prolific possibilities of this new frontier of product creation with us, a brief letter stating your field of interest will receive prompt attention.

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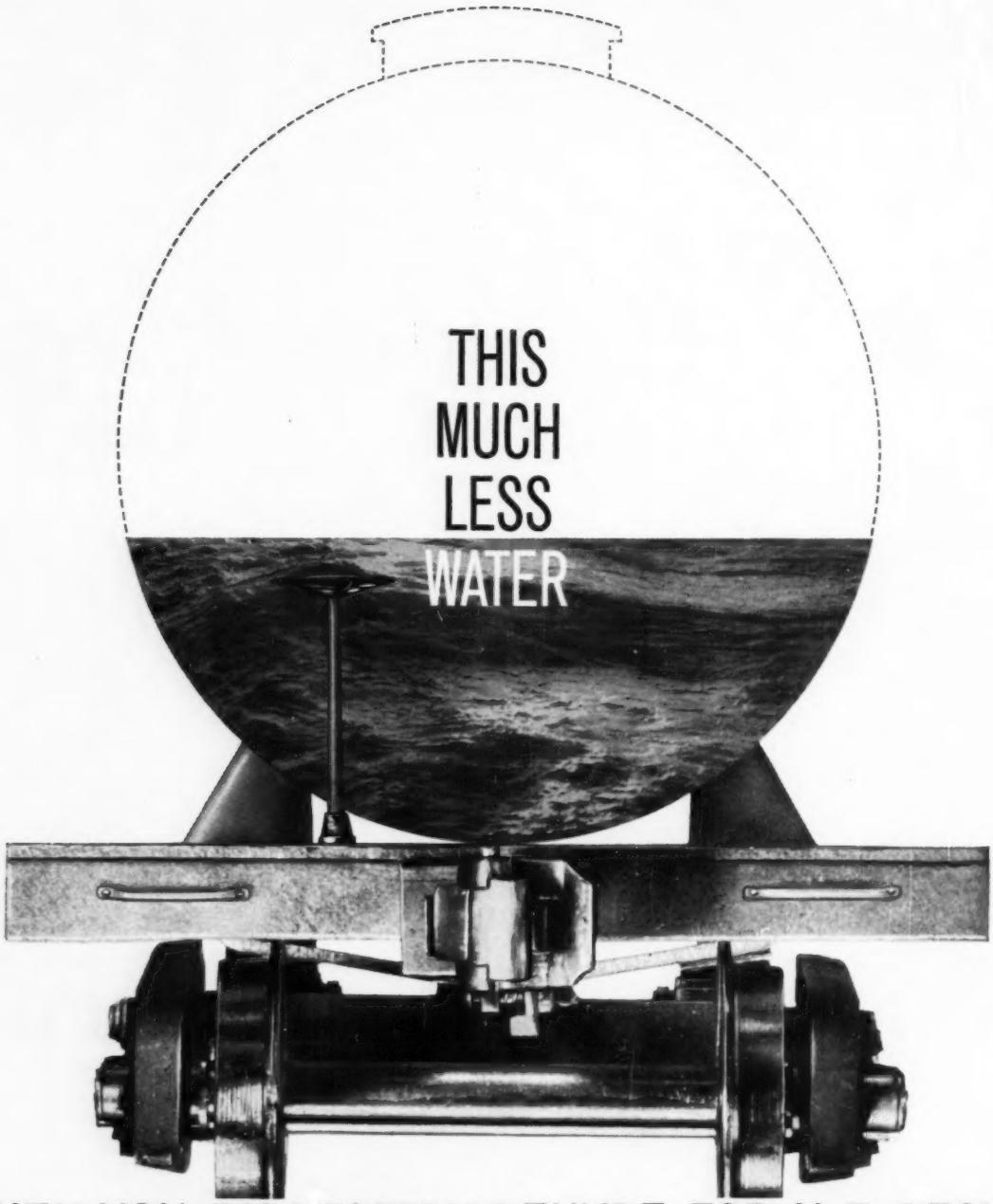

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LESS STORAGE CAPACITY for a given amount of active ingredients. Water content of U. F. Concentrate-85 is a minimal 15%.

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For specifications and local offices, see our insert in Chemical Materials Catalog, pages 475-482 and in Chemical Week Buyer's Guide, pages 37-44.

Allied Chemical

NITROGEN DIVISION
Dept. UF6-7-1, 40 Rector Street, New York 6, N. Y.

2819

Business
Newsletter

CHEMICAL WEEK
July 9, 1960

High-analysis fertilizers in the West will get a boost. Collier Carbon & Chemical (Los Angeles) has entered into a manufacturing agreement with Bunker Hill Co. (San Francisco) for construction of new facilities at Bunker Hill's recently completed phosphoric acid plant at Kellogg, Ida. Under terms of the agreement, Bunker Hill will manufacture a highly concentrated green acid that's said to have unique properties; Collier will use its process and plant design. The product, to be called ALP (anhydrous liquid phosphate), will be used mainly in high-analysis fertilizers. Capacity the first year: 5,000 tons, with the plant expected onstream by early '61.

•

More Texas expansions are in the news:

• Columbian Carbon (Houston) will put up a new plant "in the Gulf Coast area of Texas" to produce dispersions of carbon black in polyethylene, polypropylene and other resins. Expected to start up in fourth-quarter '60, the plant will have a capacity of 8 million lbs./year, will supplement Columbian's existing production at Tacony, Pa.

• Allied Chemical has blueprinted a new plant for its low-molecular-weight polyethylene (emulsifiable grade 629) at Orange, Tex. New facilities, due onstream by mid-'61, will increase annual output 50%. Industry estimates Allied's current Orange capacity at 10-15 million lbs./year; its Tonawanda, N.Y., capacity at 20 million lbs./year.

• General Electric has selected a site in Houston for a tungsten carbide products manufacturing plant. The $1-million facility will be a branch of the company's metallurgical products department in Detroit, will use tungsten carbide powder supplied by the Detroit plant. Completion date has not yet been targeted.

•

Celanese Corp. is planning to give its plastics and films the same high-power marketing push it's been giving to textile fibers. The company has just reorganized divisional operations: to the existing Celanese Fibers Co. and Celanese Chemical Co. are added the Celanese Plastics Products Co. and Celanese Polychem Co. (The latter two supersede the former Plastics Division.)

John W. Brooks, former president of Celanese Fibers, has been made an executive vice-president, will direct both the fibers and plastics product companies; R. W. KixMiller, also a newly appointed executive vice-president, has been assigned directional responsibility over Chemical and Polychem companies. Both KixMiller and Brooks were former corporate vice-presidents.

One industry observer sees the move as a "new look (by Celanese) at the film and bottle business as potential profit-makers, deserving attention in their own right."

Four U.S. chemical ventures in Mexico are shaping up as part of Mexico's strong drive into chemicals (*CW, July 2, p. 21*).

One project seemingly firm: a joint venture between Dow Chemical and a major East Coast chemical concern. It will use fluorspar from Dow's Mexican mine, market its output principally in the U.S.

And Beryllium Resources (Los Angeles)—jointly owned by Atlas Corp., New York investment firm, and Federal Resources Corp.—reportedly has signed two agreements: one with the Mexican government to explore and mine beryllium ore and other metallic ores; and another with Brush Beryllium (Cleveland) by which the two firms jointly would put up beryllium processing plants as needed.

Although uncertainty about the extensive petrochemical program being undertaken by Mexico's government-owned oil monopoly (Pemex) is forestalling decisions on petrochemical projects, American & Foreign Power Co. is interested in building a urea plant in Mexico. The company has capital in Mexico ready to be invested, and it could get urea technology from Chemical Construction Corp. (Chemico)—which, like American & Foreign Power, is an affiliate of Electric Bond and Share Co.

Meanwhile, Sun Chemical Corp. (New York) has acquired 26 acres in Toluca (near Mexico City) to build a plant to produce both organic and inorganic pigments. It's said to be a sizable investment designed to fill all of Mexico pigment needs for such industries as printing and plastics.

•

Look for a cautious tone in second-quarter financial reports coming out this month. Sales of chemicals and allied products have been running strong, and various industry leaders—such as Allied Chemical's Chairman Kerby Fisk—are still looking for an upturn in over-all industrial activity late this summer. But a growing number of economists—like Research Director Frank Morris of the Investment Bankers Assn.—are discussing various "weaknesses" showing up in the economy.

Nevertheless, the larger chemical companies are holding fast to their increased capital spending programs for this year. Fisk says Allied has not changed its capital budget of $85 million, which is about twice what the company invested last year. Union Carbide—whose second-quarter sales and earnings may dip 4% and 14%, respectively, below last year's peaks—may spend even more than the $175 million previously estimated at this year's plant and equipment outlay.

•

A court battle is starting over two new coccidiostat products recently announced by Merck & Co. and Aries Associates (*CW Technology Newsletter, June 25*). In federal court at New Haven, Conn., Merck is suing Aries for $7.8 million, plus unspecified additional sums for punitive and other damages. Merck alleges that Aries "unlawfully and surreptitiously" obtained secret lab data on Merck's new drug. A hearing on Merck's request for an injunction has been set for July 18.

versatility (vûr s*a* til'i-ti) *n.* **The state of being capable of turning with ease from one task to another. Many-sided; able to do many things well; quality of being versatile.**

Behind process plant profit is the inherent versatility of design which only experienced men can provide. Vitro engineers have met many challenging assignments...and are well prepared to assist in designing and building profits into your next expansion.

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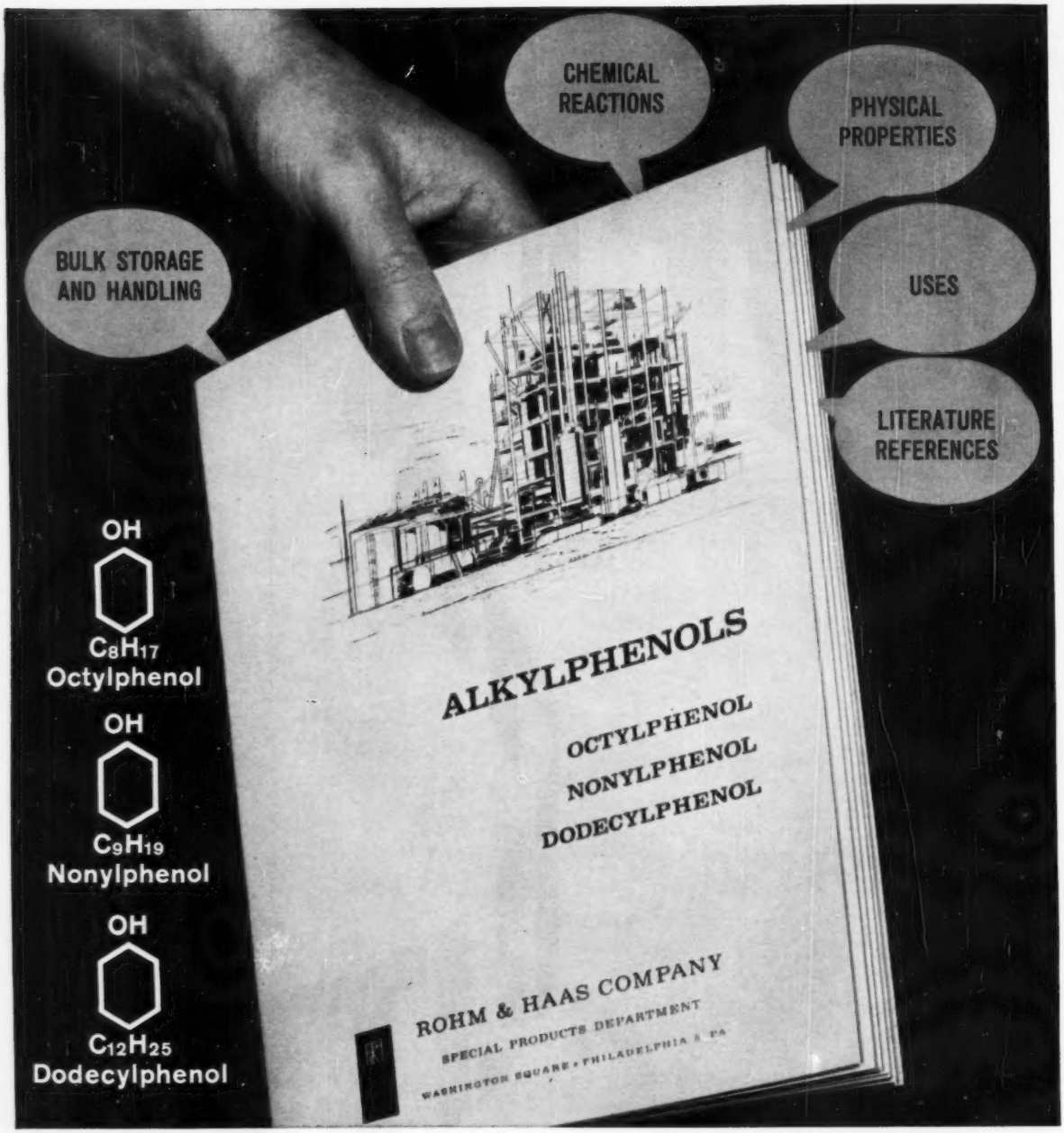

Get this useful information on Alkylphenols

Here is a booklet that will help you in working with alkylphenols. It was designed to aid technical men doing either research, development, or production work. The contents include not only a description of many useful reactions, but also recommendations for handling and storing production quantities of these versatile, low-cost intermediates.

Write to Dept. SP-13 for your copy of this 16-page booklet. Sample quantities of alkylphenols are also available.

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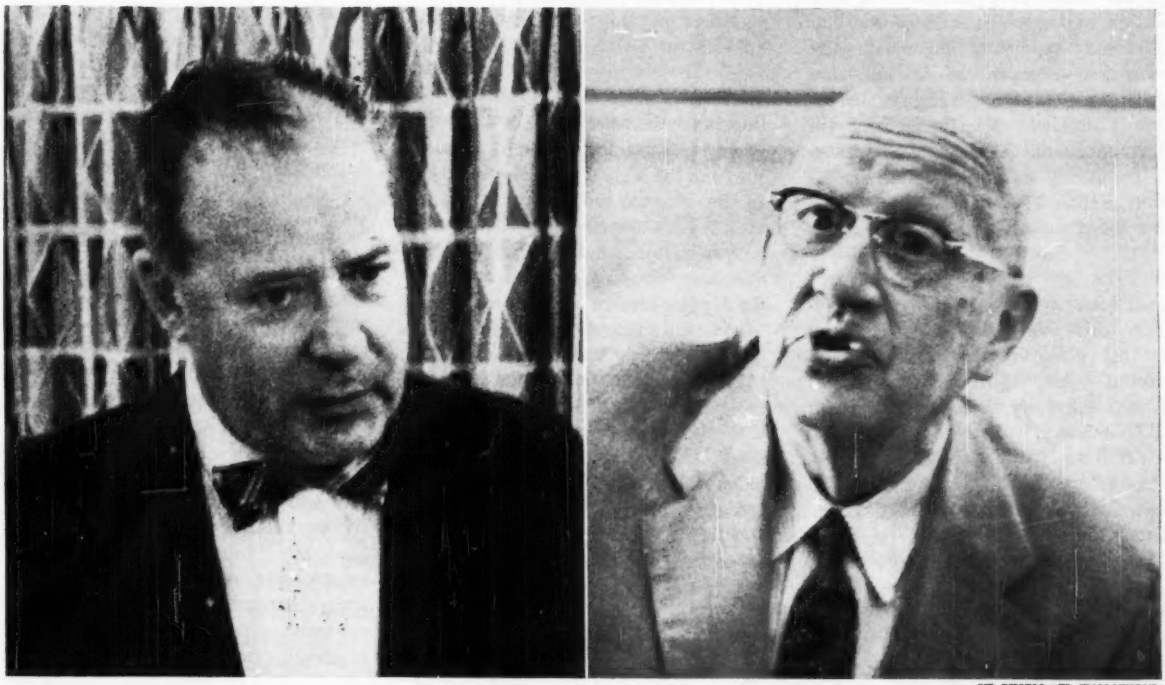


CW PHOTOS—ED WALLOWITCH

SOCMA's Baker, Lawrence: They blast government's plan for negotiating tariff cuts on chemicals.

Tempers Flare Over Tariff Cuts

Some irate chemical industry spokesmen are planning a slashing attack on the long list of chemicals proposed for possible U.S. tariff concessions at public hearings in Washington next week. They are bitterly denouncing what they consider unfair treatment of U.S. industry.

Spearheading the attack are three leaders of the Synthetic Organic Chemical Manufacturers Assn.: Sam Baker, SOCMA president; C. K. Black, chairman of SOCMA's International Commercial Relations Committee; and P. K. Lawrence, former SOCMA vice-president and now a consultant to that militant organization. All are from Du Pont: Baker is general manager of Du Pont's Organic Chemicals Dept.; Black is manager of trade relations for the company's Dyes & Chemicals Division; and Lawrence retired last fall from that position.

Producers of dyestuffs and coal-tar intermediates are particularly incensed over the government's preparations for the international tariff negotiations to be held next fall and winter in Geneva, Switzerland. Their principal complaints:

(1) The proposed list of imports for U.S. concessions—published late in May (*CW, June 11, p. 23*)—"constitutes the most sweeping threat to U.S. industry in the history of the General Agreement on Tariffs and Trade (GATT)."

(2) The government's continued use of indefinitely inclusive "basket clauses" in its list of chemicals to be considered for U.S. concessions "is a mortgage-in-advance on our future business, is contrary to the intent of Congress, and is a flat repudiation of what the President had promised."

(3) The itemization of dyes, pigments and intermediates on the U.S. list "bears every indication that it has been drawn up with expert technical guidance for the sole benefit of half a dozen principal foreign producers."

(4) Inasmuch as the U.S. government is not planning to include industry advisors on its bargaining team for the GATT parleys, U.S. chemical companies "will not be adequately represented, seeing that other industrialized nations' delegations always include commodity experts from the industries concerned."

(5) "Imports of dyestuffs and other synthetic organic chemical products into the U.S. are increasing steadily under present tariff rates, so it's apparent that no reductions are called for."

(6) Particularly in view of the government's continued use of "basket clauses," the time allowed for preparation and presentation of industry views is "completely inadequate."

But the government people responsible for the U.S. trade and tariff program heavily discount the SOCMA

leaders' charges. State Dept. and other officials working in this field give this point-by-point rebuttal:

(1) The number of items appearing in the preliminary list gives no indication of the seriousness of the cuts that may be finally negotiated. The new list—expected to be cut after next week's public hearings before the Committee for Reciprocity Information and the Tariff Commission—tentatively is the second longest ever prepared for GATT negotiations; the longest was the one drawn up in 1945.

Some 200 other synthetic organic chemicals were considered for inclusion this year, but were rejected by the government's own screening groups. And government officials firmly deny any intent to harm any U.S. industry.

(2) This year's listings have less "basket" in them than any of the lists from which U.S. bargainers negotiated in previous GATT sessions. Congress has not seen fit to legislate different procedures, as it could do at any time. Government officials maintain that their program and procedures are in fact approved by the President and consistent with whatever promises he may have made on the subject.

(3) There's no question but what European and Japanese chemical producers are the prospective beneficiaries of any U.S. tariff concessions, because they are the biggest (outside the U.S.) in the Western world. But U.S. officials say it's only fair to point out that reciprocal tariff cuts negotiated with European countries—which make up the biggest market for U.S. exporters—will tend to increase sales for many U.S. companies; and that if increased U.S.-European trade benefits U.S. industry in general, it will tend to benefit U.S. chemical producers. The Eisenhower administration is convinced that reduced tariffs are essential for U.S. and allied prosperity; and officials say that tariff cuts negotiated next winter will not be significantly greater than those negotiated in previous years—"and there's no sign that the U.S. chemical industry was stunted by those cuts."

(4) This year's U.S. delegation to the GATT meeting will be an all-government team (*see below*). In past years, industry representatives served as advisors, but are not being taken this year because of budgetary limitations. The government feels that its delegation will include commodity specialists who are thoroughly familiar with domestic industry.

(5) Both imports and exports of chemicals have grown fantastically since the end of World War II. But in recent months, synthetic organic imports have declined, according to government officials, while exports—already running several times larger than import volume—are increasing rapidly.

(6) Public hearings on the proposed list are expected to continue for six weeks to two months, and will likely result in the list's being reduced substantially. At least this is what has always happened in the past. Chemical interests may get as much as two of the six to eight weeks. Officials say this will be more time than is to be allotted to any other industry.

But the government men's arguments—based on efforts to formulate a national trade policy that will take into account the interests of all segments of the U.S. economy and also the interests of friendly nations—make little impression on Baker, Black and Lawrence, who have been in the direct line of competitive fire from foreign producers.

Their day-to-day work brings them up against countless hard facts on the difficulties of holding ground in the U.S. dyestuffs market. U.S. capacity, they feel, is "at least 35% overbuilt," and operating costs and taxes are much higher than in Europe and Japan. The U.S. has been dropping its tariffs for 25 years; other dyestuff-producing countries maintain protective duties. Just in the past few weeks, Japanese dyemakers have started soliciting business in U.S. textile centers. Granting further concessions on even a few products could be disastrous, they insist, because a producer has to keep output of by-products and coproducts in balance in order to show a profit. Granting concessions on intermediates would

WIDE WORLD PHOTOS

Taking U.S. Tariff Case to Geneva

The official U.S. delegation to the bargaining sessions of the General Agreement on Tariffs and Trade (GATT), starting next fall in Geneva, will be headed by Undersecretary of State C. Douglas Dillon (*left, above*) and Assistant Secretary of State Thomas Mann (*right*)—both of whom specialize in economic affairs. John Birch, chief of State Dept.'s Office of International Trade, will lead a large contingent of specialists from the State, Commerce, Labor, Agriculture and Interior departments and the Tariff Commission. These delegates, including chemical and other commodity experts, have not yet been named. But they will include Lowell Kilgore, chief of the Business & Defense Services Administration's Chemical Division; Frank Gonet, chief of the Tariff Commission's Chemical Division; and/or their staff assistants. Tariff talks start in January.•

allow foreign producers to ship in their cheaply made intermediates and let their U.S. affiliates compound dyes on an assembly-line basis—"which is what they're set up for."

These industry men despair of help from "escape clause" actions, but they cherish one hopeful thought. Five years ago, they point out, the U.S. government took many dyestuffs off its GATT bargaining list after 10 U.S. producers showed confidential figures on their rates of return. Du Pont and possibly other companies will use that same strategy this year—"and the rates of return now are even lower than in '55."

Two Steps for Chatham

Houston Chemical Corp.—this year's major new entry in the ethylene derivatives field (CW, June 11, p. 21) —last week took two big steps toward full-scale operation:

- It awarded a contract to Scientific Design for engineering and construction of an 80-million-lbs./-year ethylene oxide-ethylene glycol plant, to be built near Beaumont, Tex.
- It acquired a headquarters by signing a long-term lease on one floor of a building at 200 Madison Ave., New York.

The ethylene derivatives plant is expected to be the largest one using SD's air-oxidation process. Construction is to begin this summer and to be completed in about 12-14 months, according to Vincent Shea, chairman of the executive committee of Chatham-Reading Chemical Corp., which is Houston's parent company.

Shea said the newly leased offices will include room for personnel who were transferred to the new company when it purchased the antifreeze and other business of Commercial Solvents' Automotive Chemicals Dept.

Houston has not yet decided on awarding a contract for its proposed tetraethyl lead and tetramethyl lead plant, also to be located at Beaumont.

The ethylene derivatives and gasoline additives plants will be adjacent to the 380-million-lbs./year ethylene plant that Socony Mobil expects to bring onstream early next year. Houston's plants will get their ethylene requirements from the Mobil unit.

Philadelphia and Reading Corp. (New York) is majority owner of Chatham-Reading.

Building for a '64 Boom

Despite considerable overcapacity in the U.S. aluminum industry, expansions—from primary products to fabrication—are continuing at a brisk pace this week.

But industry leaders, pointing to rising consumption in structural and industrial applications, look to '64 as their target year for a balance between supply and demand.

Underscoring industry optimism are moves such as United Pacific Aluminum's recent plans for primary production near Longview, Wash. (*CW Business Newsletter, June 25*). Some other current expansions:

- Aluminum Co. of America—which just two months ago started up its 175,000-tons/year smelter near Warrick, Ind.—has just scheduled two major sheet mill expansions and modernizations. Lawrence Litchfield, Jr., executive vice-president, sees a sharp rise ahead in aluminum sheet construction. The company has allocated $10 million for its plant at Davenport, Ia., $8 million for its Alcoa, Tenn., operations.
- Harvey Aluminum (Torrance, Calif.) is making its first public stock offering—750,000 shares of Class A common for acquisition and construction. The company plans to become a fully integrated producer—from primary reduction to a complete range of fabricated products. Plans now under way: an addition to its 60,000-tons/year aluminum reduction facility at The Dalles, Ore., increasing capacity by 25%; and additions to its 30,000-tons/year fabricating facilities at Torrance. Estimated '60 expenditures: $12.6 million. Looking farther ahead the company hopes to build a $30-million bauxite operation to supply its primary reduction facilities, is investigating bauxite possibilities in Jamaica and British Guiana.

Another stock offering just registered: American-International Aluminum Corp. (Miami, Fla.), extruder of aluminum rod and billets, is offering 400,000 shares of common to finance its San Jose, Calif., extruding plant, now under construction.

And in high-purity aluminum, Kaiser Aluminum & Chemical is adding specially designed cells to its facilities at Mead, Wash. Each cell reportedly will have a capacity of 36,000 lbs./-year, total plant capacity being brought to 3 million lbs./year.

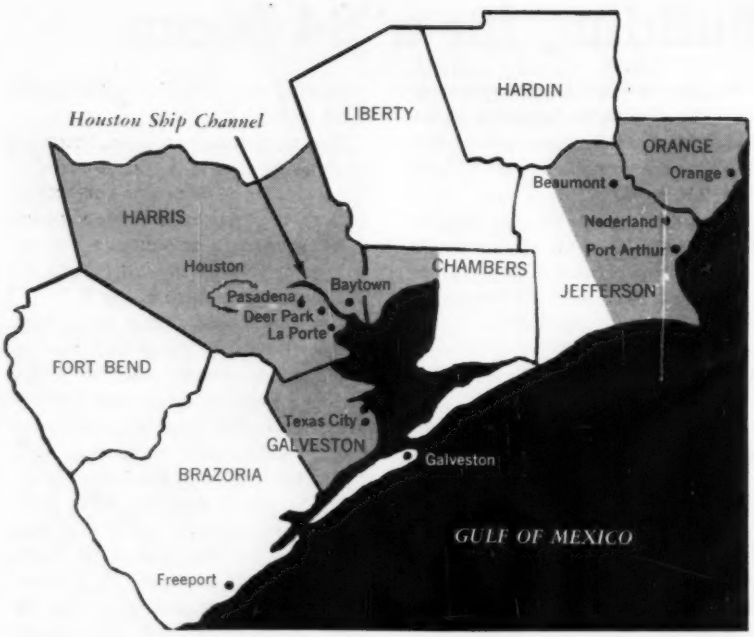
Biggest current problems, according to industry analyst R. W. Michaud of Dean Witter & Co., are competitive factors in fabrication and a severe price squeeze. Consumption abroad, he noted, is growing faster than the 7½%/year rate here in the U.S.

Growing Competition: Some large chemical process companies now in aluminum fabrication may be on the verge of deciding to go into primary production. And Canada's Aluminium Ltd. is being closely watched by U.S. producers. Although the Justice Dept. halted its bid to purchase Apex (Chicago), an aluminum fabricating firm, the Canadian company could make deals to supply ingot to U.S. fabricators and buy back scrap—an effective sales method in times of price cutting; could sell secondary metal to the huge auto industry, and could become a supplier to companies like Apex.

Earnings of the three integrated U.S. producers declined in '59 vs. '56, despite increased tonnage, it was pointed out by Robert Maloney of Standard & Poor's Corp. They've already expanded beyond present needs, and costs and depreciation of facilities are cutting current income. Also, there's not much profit in fabrication.

Added Uncertainty: And abroad, Africa is adding uncertainty to the aluminum price picture. Development of Africa's bauxite deposits near hydroelectric sources could yield low-cost production. Maloney holds that Africa eventually is certain to become a big aluminum source, but capital might come from the Soviet bloc—and then aluminum prices might be more like those of copper than of steel. It's said that U.S. producers right now would like to raise aluminum prices, but the metal is selling in Europe at 2-3¢ under the present U.S. price.

There's no concern, according to Edward Heinbecker of Continental Insurance Co., that aluminum producers can finance further expansion. But changing world factors, lagging consumption growth in the U.S., and continued pressure on profits would seem to indicate that the industry must trim its sails for a long upwind tack well into the '60s.



Land Grabs Jar Gulf CPI

For chemical process companies whose plants dot the Texas Gulf Coast, annexation troubles are flaring anew. In the highly industrialized area between Houston and Orange (map), cities and towns are annexing outlying areas right and left.

Plant managers in the area have been forced to devote more and more attention to state and local governmental relations (*CW, Dec. 26, '59, p. 21*); and Texas industrialists are becoming increasingly concerned about the candidates who will be elected this fall to the legislature that will meet next January to April.

Clampdown Coming: It's likely that the legislature will consider measures to limit the power of cities to take in new territory without the consent of the property owners. In public hearings last week, a committee of the 1959-60 legislature made it clear that there is now no law to prevent a "home rule" city like Houston from incorporating all state land except what is already incorporated in other cities.

Plants along the Houston Ship Channel are not involved in the annexation wars, because they are in the Port of Houston Industrial District. But most of the other chemical and petrochemical plants in the five CPI-rich counties stand to be included in greatly extended city limits if the annexation moves become final and binding.

Industry Inhibited: In the committee hearings, a group of industry representatives—including spokesmen for Du Pont, Texas Butadiene & Chemical, and several oil companies—testified that annexation and threats of annexation would tend to curb industrial growth in the area. "Municipal taxes can so stifle industrial growth," one witness declared, "as to result in a gradual decrease in available jobs as obsolescence and lack of incentive to modernize takeover."

Among the latest annexation moves, all of which are only tentative:

- The city of Nederland, population 12,032, took in 689 square miles in Jefferson County and adjacent tidelands. This would make Nederland larger than Los Angeles or London, and block the growth of Beaumont and Port Arthur.
- Texas City took in nearly all the unincorporated land on the mainland portion of Galveston County.
- Baytown took in the Humble Oil refinery site and adjoining lands in Harris and Chambers counties. The city council's reason: "We were afraid Houston might take it."
- Pasadena, Deer Park, La Porte and Lomax together took in about 101 square miles in southeastern Harris County; and Houston's city council—over the vigorous opposition of Mayor Lewis Cutrer — thereupon voted to annex all of the remaining 1,100 square miles of unincorporated land in that county.

And to their annexation woes, Texas chemical men can add a new civic headache. In a decision handed down last week, State District Judge Jack Roberts declared Texas' new natural gas "severance beneficiary" tax to be unconstitutional. Likely upshot: new attempts in the '61 state legislature to levy some kind of direct tax on chemical process companies.

Tariff Cuts in Europe

The first tariff wedges were driven last week between Europe's two trading blocs, the six-nation European Economic Community (the Common Market), and the European Free Trade Assn. (the "Outer Seven").

The tariff moves made by both groups won't have much direct effect on U.S. exports or on the trade patterns between the blocs. But they serve as stark warning that no real solution has yet been found to prevent the breach from widening to the point where it could eventually split the West.

Both blocs last week cut their internal tariffs—the duties on shipments between member nations. It was the first cut for the EFTA — a 20% slice on industrial goods, which is to be followed by a series of 10% cuts, leading to free trade within the area by 1970. Member nations will retain their individual external tariffs.

EEC countries reduced their internal tariff by 10%. The first 10% cut was made 18 months ago, and was extended to outsiders. The effects of last week's cut, and the 10% cut slated for next January, may be softened by reciprocal tariff concessions at this fall's GATT session (*see p. 23*). But outsiders will begin to feel EEC's discrimination after Jan. 1, when it takes the first step toward its common external tariff, boosting duties on many chemical products going to Germany and the Benelux countries.

COMPANIES

Ions Exhange and Chemical Corp. (New York), manufacturer of bacteriostats, textile, rubber and plastics additives, has changed its name to Yardney Chemical, Inc. Simultaneously it assumes the marketing functions of Yardney Chemix Corp., until now sole U. S. sales agent for Ions Exchange Products.

•

The Flintkote Co. (New York) and Diamond Portland Cement Co. (Middle Branch, O.) have approved a plan for merger through an exchange of stock. Formula: one newly issued $2.25 Flintkote convertible preferred share for each share of Diamond common. Flintkote entered the cement field in '57 with acquisition of Kosmos Portland Cement Co. Diamond will be its second cement plant.

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Experiment Inc., a wholly owned Texaco subsidiary that researches high-energy fuels, has changed its name to Texaco Experiment Inc. Latest link in its chain of developments: an "air-turborocket," which adds a turbine-driven compressor to the ramrocket. Experimental models have been under test at government proving centers.

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Garfield & Co. (Edison, N.J.), manufacturer of Garfield's Seidlitz Powders, has acquired the stock of Texas Medico Pharmacal Laboratories (San Antonio, Tex.), manufacturer and distributor of pharmaceutical products. Garfield says this is the first step in a program of diversification and expansion. Details of the transaction were not disclosed.

EXPANSION

Glass Fiber: Ferro Corp. (Cleveland) will spend more than $2.5 million to expand its West Coast facilities at Huntington Beach, Calif. To be included: new equipment for producing glass fiber and for fabricating it into reinforcing materials for plastics, and a new plant for the company's Refractory Division, which will manufacture several lines of refractory specialty items now produced by Ferro plants in Ohio and Texas.

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Manganese: Foote Mineral Co. (Philadelphia) has authorized construction of a 20-million-lbs./year electrolytic manganese facility at its Johnsonville, Tenn., plant site. Estimated cost: $6 million. To be built in two stages, the first 10-million-lbs./year unit will go on-stream in late '61 or early '62. It's Foote's third manganese expansion since '56, when the company acquired Electro Manganese Corp.

•

Plastics Containers: Plax Corp. (Hartford, Conn.) will build its fourth plastic bottles and containers plant, this one to be located at Sharonville, O. The company has purchased 12 acres for a 60,000-sq. ft. building to be completed by the end of the year. Costs were not disclosed.

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Metro-Atlantic, Inc. (Centredale, R.I.), will build a chemical plant in Simpsonville, S.C., to manufacture dyestuffs and chemicals for the textile industry. Up to now the company has been leasing a plant on the outskirts of Greenville.

FOREIGN

Synthetic Rubber/Europe: Royal Dutch-Shell's synthetic rubber plant near Rotterdam now is in operation; and in France Societe des Elastomeres de Synthese is planning to build a polybutadiene rubber plant near its almost completed 50,000 tons/year BSR-type plant outside Marseilles. The Shell plant's output of 60,000 metric tons/year is expected to fill all needs of the Benelux countries, with some product left over for export. The French polybutadiene plant will have a capacity of 25,000 metric tons/year.

•

Investment/Japan: Japan's foreign investment policy is softening. Evidence: the Foreign Investment Council reportedly has approved establishment of a joint company, Japan Oil Cleanser, in which Oronite will hold 44% interest, rather than the 30% originally established as maximum. Oronite's partner: Japan Petrochemical. And a German firm will hold 49% interest in Japan-Westphalia, a new company, which will manufacture coal mining machines.

•

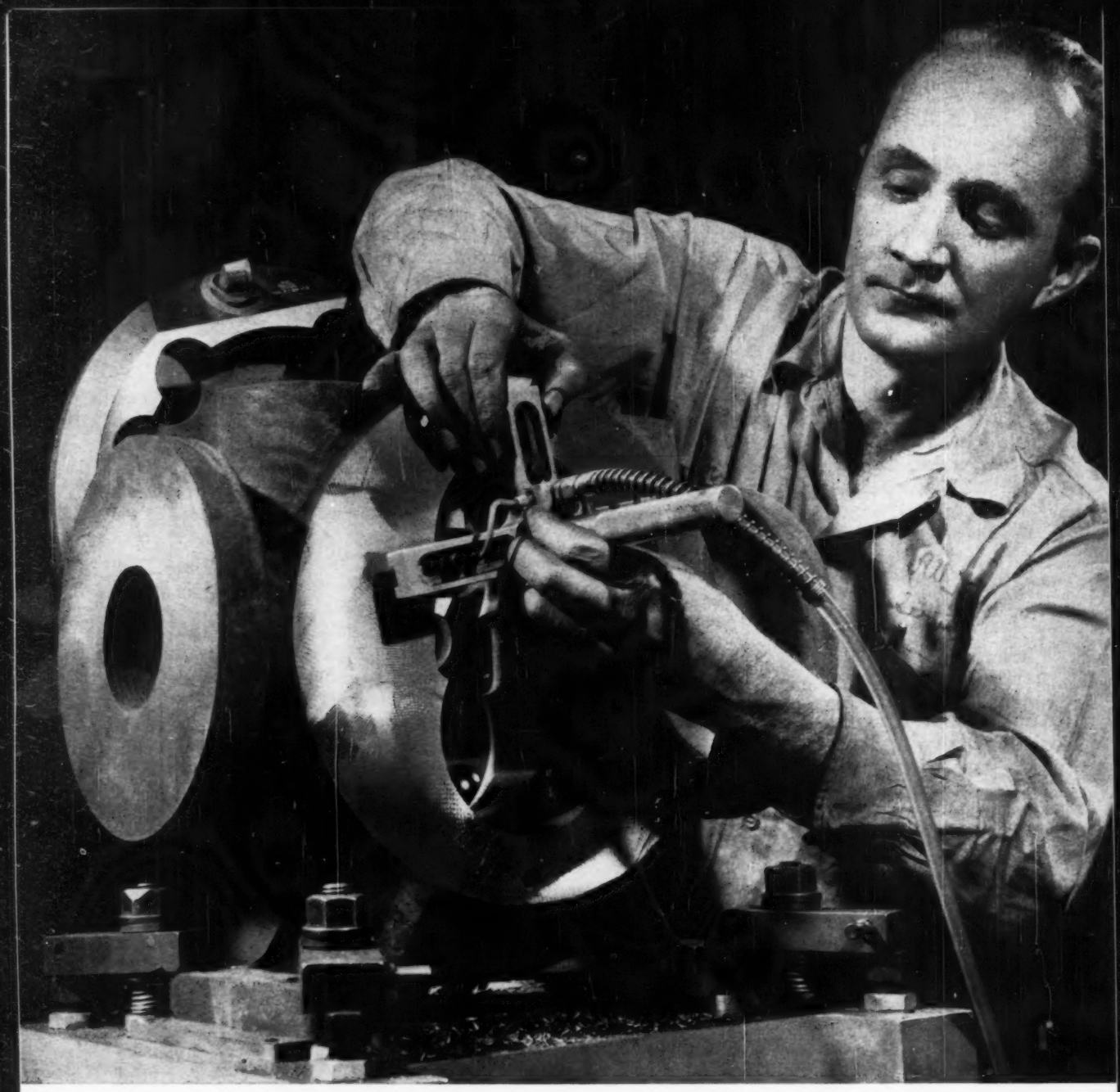
Nitrogen Fertilizer/U.A.R.: The Soviet Union will construct and equip Syria's first nitrogen fertilizer plant, to go up near Homs. Initial capacity: 45,000 tons/-year, with an ultimate capacity to be 120,000 tons. Planned startup: '64. The state-owned and operated $8 million-plant will be part of the United Arab Republic's five-year industry plan.

•

Fertilizers/India: Mitsui Bussonkaisha will collaborate in the construction of a proposed $25-million plant to be set up at Durgapur, West Bengal. Apart from its technical fee, the Japanese firm will also invest in the new company. The $48-million venture is slated to produce 60,000 tons/year of nitrogen-phosphate fertilizers. It will be Japan's first fertilizer interest in India. Basic raw material: coke-oven gas from the Durgapur steel mill. Production target date: '64. And Koppers Co. (Pittsburgh) reportedly is negotiating for construction of a fertilizer plant in northwest India. Its capacity would be 80,000 tons/year of nitrogen fertilizer.

•

DMT/Italy: Chemische Werke Witten (Witten/Ruhr), a wholly owned subsidiary of Dynamit Nobel AG. (Troisdorf), has granted to Montecatini (Milan) a license for production of dimethyl terephthalate, using the Katschmann process (oxidation of *p*-xylene).



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For the name of your nearest Worthington pump distributor consult the Yellow Pages. Or write to Worthington Corporation, Section 20-16, Harrison, New Jersey.

WORTHINGTON

Washington
Newsletter

CHEMICAL WEEK
July 9, 1960

Congress has passed a law requiring warning labels on dangerous household substances. The law, covering some 300,000 products, applies only to goods shipped in interstate commerce but is expected to serve as a model for legislation in the states.

New labels will now have to be designed for many flammable or toxic products. The labels will have to say "danger," "warning," or "caution"; state the hazard; give precautionary measures and antidotes; and have the word "poison" for materials defined as highly toxic. While the requirement is effective immediately, penalties will not be imposed for six months and that period can be extended for another 18 months in specific cases.

Packages not properly labeled are subject to seizure. Violations can bring a $200 fine, 90 days in jail, or both. FDA inspectors are given the right to make inspections in plants—a provision opposed by industry.

The law marks the first labeling measure on these products since the Federal Caustic Poison Act of 1927, which covered only 12 chemicals. The new law does not cover items already regulated by the insecticide or food and drug laws.

•

An antitrust case against Union Carbide Corp. was among the half dozen or so cases filed by the Justice Dept., as Washington worked its way to a summer vacation. Carbide was charged with using agency and fair-trade contracts "as devices to maintain the resale price of Prestone antifreeze" in Missouri and other states where fair-trade pricing is not lawful.

Other cases filed show how freely the antitrust division feels it can swing the authority of the antimerger law and other antitrust laws against relatively small firms or small industries.

Glass—The New Jersey Auto Glass Dealers' Assn. was charged with fixing prices on auto replacement glass. (The association signed a consent decree immediately upon being charged with price fixing.)

Steel—Bliss & Laughlin (Harvey, Ill.) is charged with violating the antimerger law by acquiring Sierra Drawn Steel Corp., thus removing a competitive factor in the sale of cold-finished steel bars in four Western states.

Hospital Goods—Becton, Dickinson & Co. is charged with violating the Sherman Act by fixing prices and restraining competition in the sale of hypodermic syringes and other hospital-surgical products.

Auto Parts—Maremont Automotive Products, Inc. (Englewood, N.J.), is charged with trying to eliminate competition by buying up Saco-Lowell Shops, a competing maker of auto exhaust systems.

Washington Newsletter

(Continued)

The Supreme Court has acted on depreciation of capital goods.

A decision last week involved companies that make a practice of selling used capital goods and that have been getting a capital gains advantage on income from sale of the second-hand equipment. The court has now stated, as a general rule, "Congress intended that the taxpayer should, under the allowance for depreciation, recover only the cost of the asset, less estimated salvage, resale, or second-hand value. This requires that the useful life of the asset be related to the period for which it may reasonably be expected to be employed in the taxpayer's business. Likewise, salvage value must include estimated resale or second-hand value."

The court says that depreciation allowances should be based on useful life to the taxpayer—something that both sellers and users of capital equipment have been telling Internal Revenue Service agents for years. IRS has favored extending the tax life of capital goods in some situations because it reduces deductions in a given year, thereby raises the taxpayer's taxable income.

•

Kansas City, Mo., will have to build sewage treatment facilities. It has been ordered to do so by Health, Education & Welfare Secretary Flemming. If the city refuses to comply, it might bring about a court test of the extent of federal authority to require such local action.

Flemming concluded after public hearings at Kansas City that the city and industrial plants around it are seriously polluting the river. He has set up a timetable for the city to get facilities built. If the city proposes a bond issue and the people vote it down, however, the question of what the federal government can do would then arise.

Action by Kansas City may avoid a court test, however. The city may decide to impose a sewer charge to finance sewage treatment plants instead of arranging a bond issue.

•

The U.S. has abandoned its "patience policy" toward Cuban Prime Minister Fidel Castro. Castro's take-over of the two U.S. oil refineries, Esso and Texaco, his move against U.S.-owned electric and telephone companies, and his negotiations to get Greek tanker transportation for Russian crude oil, have convinced the U.S. State Dept. that Castro is heading irrevocably for the Communist orbit.

This is made clear by two developments. One was the blunt admission by the U.S. to the Inter-American Organization of American States that its efforts to deal with Castro have failed. The other was a hurry-up plea from the White House for Congressional authority to cut Cuba's sugar quota. The move was unanimously approved in the House.

Washington is not sure what it will do next.

Do you know how many of your alcohol needs can be filled by

Low cost methanol?

It's only common sense to look at *all* raw material costs—alcohol costs, for example. Here is where lower price methanol may be able to deliver real savings over the alcohol you're now using.

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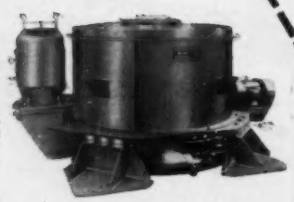
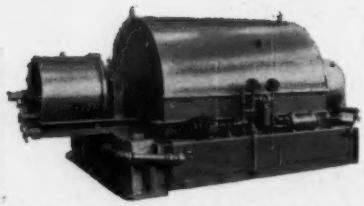
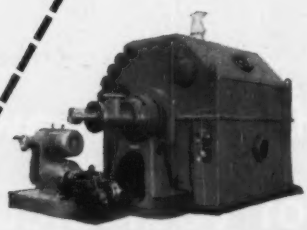
Celanese
CHEMICALS



Bird-Humboldt Oscillating Screen Centrifuges dewater coarse solids (+65 mesh) with almost no degradation or loss of solids. Screens last thousands of hours. Power cost is extraordinarily low (0.2 KWA input per ton of dried solids).



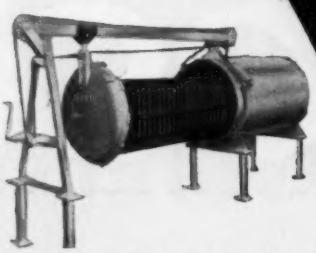
Bird Continuous Solid Bowl Centrifugals come in 7 sizes, each with a great many design variations to meet a wide range of product and process needs. Shown is the largest (54 in. bowl dia.) for ton-a-minute delivery of well dewatered solids.



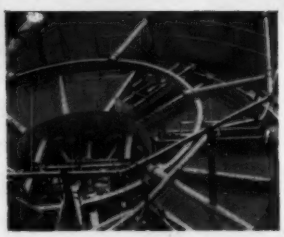
Bird-Young Rotary Drum Vacuum Filters are of unique design providing several times the usual capacity per foot of filter area, super-efficient wash, sharp wash separations and fume-tight operation when desired.

SIX WAYS TO SEPARATE SOLIDS FROM LIQUIDS

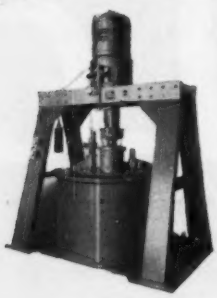
Which one is best for you?



Bird Pressure Leaf Filters provide rugged construction, large sustained filter area, high rate of flow, high working pressures (up to 75 psi standard, 250 psi special). They are custom built for the job — of corrosion resistant alloys or with special linings; insulated; steam jacketed; in a wide range of sizes.



Bird-Prayon Tilting Pan Rotary Vacuum Filters combine great capacity range with most effective, multistage washing, constant high output and minimum maintenance cost. They are ideal for handling materials that cannot be picked up by a drum or disc filter.



Bird Suspended Batch Centrifuges are for heavy duty service. They come with 26", 40" or 48" basket, perforate or imperforate. All kinds of auxiliaries are availabe, also fume-tight or explosion proof construction.

Let the *Bird Research and Development Center* help you find out. Here, under one roof, is a completely equipped and staffed, pilot-scale test plant concentrating exclusively on solid-liquid separating problems.

Bird builds the most comprehensive range of solid-liquid separating equipment, is therefore in a position to fit the machine to the job — not the job to the machine.

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Old oil storage site near Boston will give way to 3-million-gal. liquid chemical distribution terminal.

Boston Gets Chance at Seaborne Chemicals

U. S. chemical producers' distribution patterns in the lucrative New York-New England area are likely to undergo important changes in the next few weeks. Reason: startup of a bulk-liquid chemical distribution terminal near Boston—the first such terminal north of New Haven, Conn., that can handle deepwater and coastwise shipping.

For chemical companies selling in the New England area the new terminal offers several attractive features. Among them: lower shipping costs for high-volume industrial chemicals (e.g., caustic soda, methanol) moving in bulk to New England; prompter delivery and lower-cost shipment of chemicals in less-than-carload (l.c.l.) or less-than-truckload (l.t.l.) lots.

At the same time, the new terminal poses some tough problems for chemical traffic and sales management. Some would prefer to ship their products in bulk to Providence, R.I., rather than to Boston. And others point out that it would be expensive to operate out of terminal facilities so close to those they now lease in the metropolitan New York-New Jersey area.

Combining Forces: The new bulk chemical terminal is located 10 miles north of Boston in Beverly, Mass. It is owned and operated by the just-formed Beverly Chemical Terminal Co. (*CW Market Newsletter, July 2*), a joint venture of two chemical distributors — Truesdale Co., Boston-based distributor of antifreeze and chemicals for the paint, plastics and rubber industries, and Agrichem Corp. Agrichem is headquartered in Jacksonville, Fla., distributes chemicals throughout the U.S.

Beverly Chemical Terminal purchased the 11½-acre site (and some of the storage tanks) from Gulf Oil Corp., just closed the deal last week. The company hopes to complete the conversion of the facilities to handle chemicals within several weeks. Although Gulf will continue to lease storage for about 3 million gal. of fuel oil, Beverly will erect additional chemical storage tanks, bringing the terminal capacity to 6 million gal.

Some of the new facilities: a 500,000-gal. caustic soda tank; 12 new tanks, each of 133,000-gal. capacity (two of them lined with stainless steel); and numerous smaller tanks.

In addition the Beverly terminal, valued at some $2.5 million by the company, includes 45,000 sq.ft. of

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indoor storage space for packaged chemicals, and drumming and canning facilities.

Barges and Tankers: Management of Beverly figures that most of its throughput of chemicals will arrive by water—either deep-sea tanker or coastwise barge. In fact the first shipment scheduled to arrive is a bargeload of ethylene glycol for Truesdale's antifreeze canning operation. It will tie up at the dock next month.

To encourage use of the terminal facilities by chemical shippers, Beverly management is trying to line up space on a barge that makes monthly trips between New York and Boston. This barge carries liquid sugar in its main tanks, but has over 300,000-gal. capacity available for use by chemical shippers.

Moreover Wesley Wagner, Agrichem's young executive vice-president, tells CHEMICAL WEEK that the company may operate a barge of its own "when the business is there."

And, of course, the company expects that tankers plying the Atlantic and Gulf of Mexico with chemical cargoes will be making regular calls at Beverly. Reason: it costs little more to divert a tanker headed for Carteret, N.J., on to Massachusetts.

But Beverly isn't overlooking the possibility that some shippers may want to move products into the terminal by rail. The company can load or unload up to 25 tank cars at one time (including the 20,000-gal. variety) on spurs of the Boston & Maine Railroad that end on the Beverly site.

Joint Venture: Truesdale and Agrichem teamed up for different reasons. For Agrichem, forming the terminal company meets its desire to diversify into the terminal business. The firm's business ('59 sales: $7,238,000) is primarily in chemical distributing and in leasing tank transports, tractors and barges.

Last year Agrichem started to search out an area of the U.S. needing deep-water terminal facilities. Decision: Northeastern U.S. — particularly the Boston area. Reason: although considerable chemical traffic moves to New England by rail in carload lots, a great deal moves up from New York and New Jersey plants and terminals via tank truck.

According to Agrichem's estimates, such tank-truck movements cost, on the average, about 5¢/gal. for most chemicals. But the company estimates that barge or tanker movements over the same distance might cost only 1½¢/gal. Adding another 1¢/gal. charge to cover handling in and out of the terminal, plus storage and still another 1¢/gal. to cover cost of transporting material to customer, Agrichem came up with a total cost of 3½¢/gal., some 30% less than direct tank-truck shipment. (Canning, drumming or other services cost more, however.)

Agrichem figures, on this basis, that chemical shippers will soon be using the Beverly facilities to chop their transportation costs. Some of the products they expect to move through the terminal: styrene monomer, solvents, caustic soda, turpentine, vegetable and fish oils and ethylene glycol.

Agrichem wanted an ally for the new venture, found that Boston's Truesdale Co. (headed by Robert Truesdale) was eager to join in.

Expansion Plans: For Truesdale, the joint terminal venture represents another move to broaden the firm's New England chemical distribution business ('59 sales: $2 million; '60 goal: $4 million). Truesdale figures it can cut its transportation bill nearly 30% by bringing most of its chemicals through the Beverly terminal in bulk, then repackaging (canning, drumming, etc.) or transferring to tank truck or tank car for shipment to customers.

And Truesdale's move signals still other shifts in the New England distribution picture. Last December Truesdale acquired partial control of old-time chemical distributor E. F. King Co. (Norwood, Mass.). Other acquisitions likely will follow.

Although it is half-owner of Beverly Chemical Terminal, Truesdale is simply a lessee. Chemical shippers that lease storage space in the terminal may use any combination of packaging and transportation they desire.

Chemical Shippers: Just how many chemical shippers will decide to use the Beverly Chemical Terminal facilities is not yet certain, of course.

For chemical producers selling considerable tonnages of products in the New England area the problems of cutting distribution costs for that region are not new. Some shippers

Progress Report...

—2-methyl-1-butanol, commercial
—UCAR butylphenol 4T
—epoxy resins

Streamlined processing—with 2-methyl-1-butanol, commercial

Like almost everything in our modern world, chemical processes can be streamlined, too. In short, you can get faster reactions with fewer side reactions, by-products, and residues.

If your process employs a primary alcohol, you can "streamline" it with CARBIDE's commercial grade of 2-methyl-1-butanol, consisting entirely of five-carbon primary alcohols. Used as an intermediate, this mixture gives quick, complete reactions and highly efficient production. There are no competing side reactions, no by-products, and no un-reacted residues.

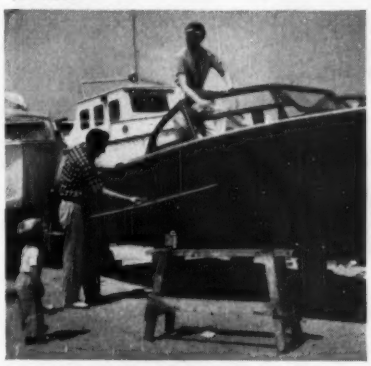
Water-white, liquid 2-methyl-1-butanol is a mixture of the branched chain primary amyl alcohols: 2-methyl-1-butanol and 3-methylbutanol-1 with small amounts of pentanol-1. Typical analysis shows 86% by weight of 2-methyl-1-butanol. Boiling point of the mixture is 130° C. and it sets to glass below −90° C. In water at 20° C., it is 2.2% soluble by weight.

While the primary alcohols in amyl mixtures have similar physical and reaction properties, their pharmacological properties are distinctive. Where isomeric contamination is undesirable, the use of 2-methyl-1-butanol permits preparation of products with controlled flavor, odor, and biological characteristics.

The branched-carbon structure of 2-methyl-1-butanol has advantages where solubility, compatibility, and substantivity are important. Its molecular structure is a major factor in lubricants, helping to provide low-temperature pour-points without sacrifice of body at high temperatures. Branched-chain ester plasticizers are faster-solvating and are compatible in a wide variety of systems. In resins, methyl substitution reduces crystallinity. Additives for oils, greases, paints, and other oleaginous materials are more compatible and more soluble when made from such intermediates. Check the coupon below for a copy of a technical bulletin.

Now molten UCAR butylphenol 4T available in tank cars

UCAR butylphenol 4T is now being shipped in molten form in both insulated tank cars and tank trucks. This relatively new chemical is also supplied in near-white flake form in 50-pound bags. Its molecular weight is 150.21 and specific gravity is 0.9081 at 114/4° C. Freezing point is 97° C., and boiling point, 236°-238° C. at 760 mm. CARBIDE produces UCAR butylphenol 4T to these specifications: *para*-Tertiary-butylphenol—97 wt. % min.; *ortho*-Tertiary-butylphenol—1 wt. % max.; Di-tertiary-butylphenols—2 wt. % max.



UCAR butylphenol 4T is the starting material in the production of oil-soluble phenolic and modified phenolic resins used for varnishes and lacquers. Combined with appropriate drying oils, the resins give light-colored coatings that are rapid-drying, tough, and resistant to light, water, acids, and alkalies.

UCAR butylphenol 4T is also useful as an intermediate in the manufacture of other products of many types. Among these are antioxidants, waterproof starch finishes and adhesives, pour-point depressors and emulsion breakers for petroleum oils, vinyl ether and dimethylol melamine type plastics, tackifiers and vulcanizers for rubber and curing agents for neoprene adhesives, synthetic lubricants, insecticides, and industrial odorants. For prices and a special Technical Information Bulletin, check the coupon.

Sure cure for epoxy resins

CARBIDE's alkylene amines are effective curing agents or hardeners for both liquid and solid types of epoxy resins. Diethylene triamine, triethylene tetramine, dimethylamino propylamine, and diethylamino propylamine are excellent for room-temperature curing of small masses of resin. These amines are especially suitable when used with resins intended for potting or encapsulating electrical components. The alkylene amines are also used as curing agents in laminating resins.

An interesting new booklet on CARBIDE's epoxy curing agents is now available. For your copy, check the coupon.

Tear out this coupon. Check the boxes on which you'd like more information, and mail to Dept. H, Union Carbide Chemicals Company, Division of Union Carbide Corporation, 270 Park Avenue, New York 17, N. Y.

- ☐ 2-methyl-1-butanol, commercial
- ☐ UCAR butylphenol 4T
- ☐ Bulletin F-8665B (Epoxy Resins)
- ☐ 1960 Physical Properties of Synthetic Organic Chemicals — a comprehensive description of the properties and applications of nearly 400 CARBIDE chemicals.

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Company _____

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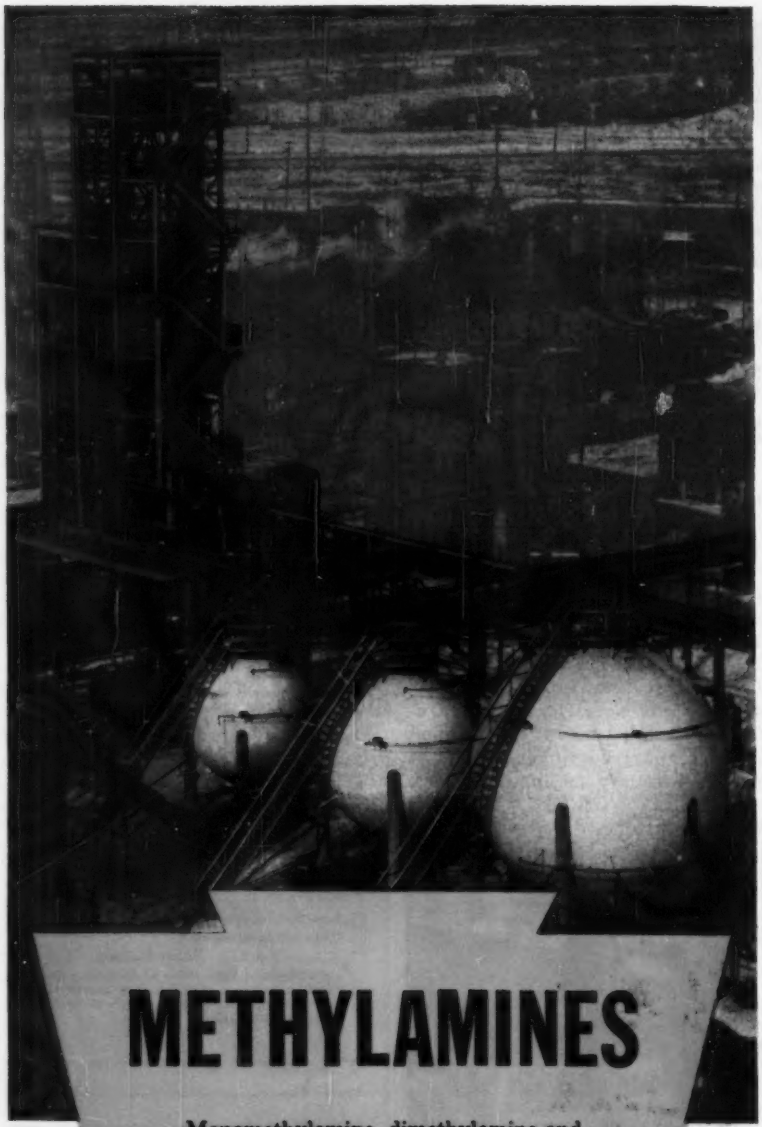

METHYLAMINES

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have for some time seriously considered establishing terminal facilities north of New Haven. But some traffic men contend that the Boston area as the site of a terminal is a drawback. They say there are more chemical users nearer Providence, that it would be more advantageous to set up a terminal there.

Moreover, those shippers operating storage facilities in the New Jersey area feel that Boston storage might add to their inventory and storage costs without significant benefits.

But some shippers are definitely interested in the new operation. Agrichem and Truesdale say that at least five of the "major chemical companies" are considering using the terminal.

Dow Chemical Co., for example, tells CHEMICAL WEEK that it considers the New England market important, may use the new terminal, depending on its needs. Conversely, Monsanto Chemical Co. has shown no interest in using the facilities. Union Carbide reportedly is studying the terminal's possibilities.

Clearly it will be some time before most chemical companies shipping to New England will assay all the potential benefits and problems involved in using the Beverly terminal. But it's a good bet that over the long haul few will ignore it.

DATA DIGEST

• **Chlorine Safety Data:** New safety data sheet (SD-80) discusses chlorine's properties, hazards and proper handling methods. Manufacturing Chemists' Assn. (1825 Connecticut Ave. N.W., Washington 9, D.C.).

• **Polyethylene:** Technical bulletin describes the effects of melt index and resin density on processing and performance characteristics of polyethylene resins. Also included: discussion of melt indices and densities of common polyethylene blends and reground material. Plastics Division, Monsanto Chemical Co. (Springfield, Mass.).

• **Corrosion Inhibitors:** Two data sheets list property and use data for two nonionic corrosion inhibitors designed for use on ferrous metal surfaces. Chemical nature of material: sorbitan fatty acid ester. Chemicals Division, Atlas Powder Co. (Wilmington 99, Del.).

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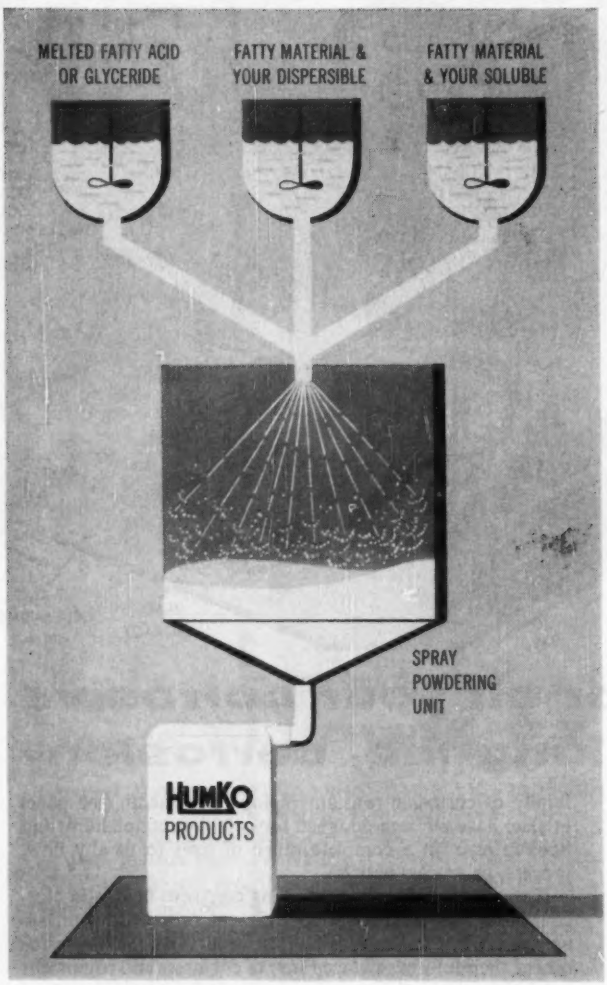
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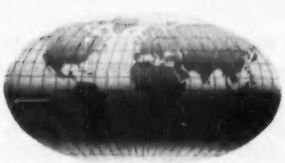

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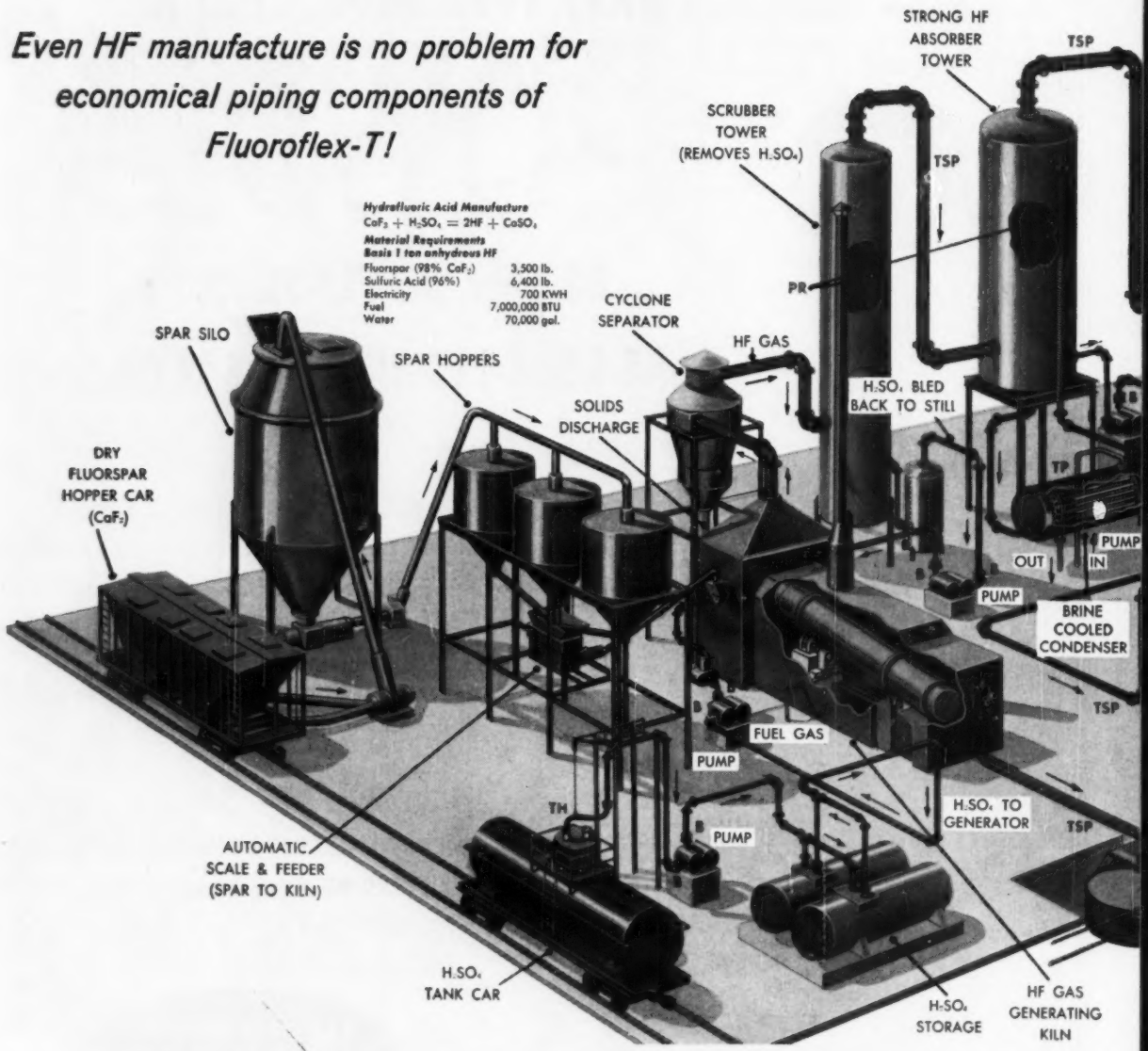
Even HF manufacture is no problem for economical piping components of Fluoroflex-T!



Hydrofluoric Acid Manufacture

$CaF_2 + H_2SO_4 = 2HF + CaSO_4$

Material Requirements

Basis 1 ton anhydrous HF

Fluorspar (98% CaF_2)	3,500 lb.
Sulfuric Acid (96%)	6,400 lb.
Electricity	700 KWH
Fuel	7,000,000 BTU
Water	70,000 gal.

NOW AT LAST, for all your corrosive of long-life, corrosion-

Now it is possible for you to pipe your entire corrosive process from start to finish in corrosion-impervious Fluoroflex®-T, to save you money in faster installation, and decreased maintenance, process downtime, replacements, and production headaches!

Fluoroflex-T, the proprietary Teflon® product manufactured and fabricated solely by Resistoflex, combines two important elements:

1. The widely-known corrosion-imperviousness of Teflon; complete resistance to *any* chemical (except high-temperature fluorine and the molten alkali metals) up to 500°F.!

2. Optimum flexibility, density, strength, and flex-life; nonporosity and structural uniformity; all imparted by Resistoflex's superior fabrication techniques.

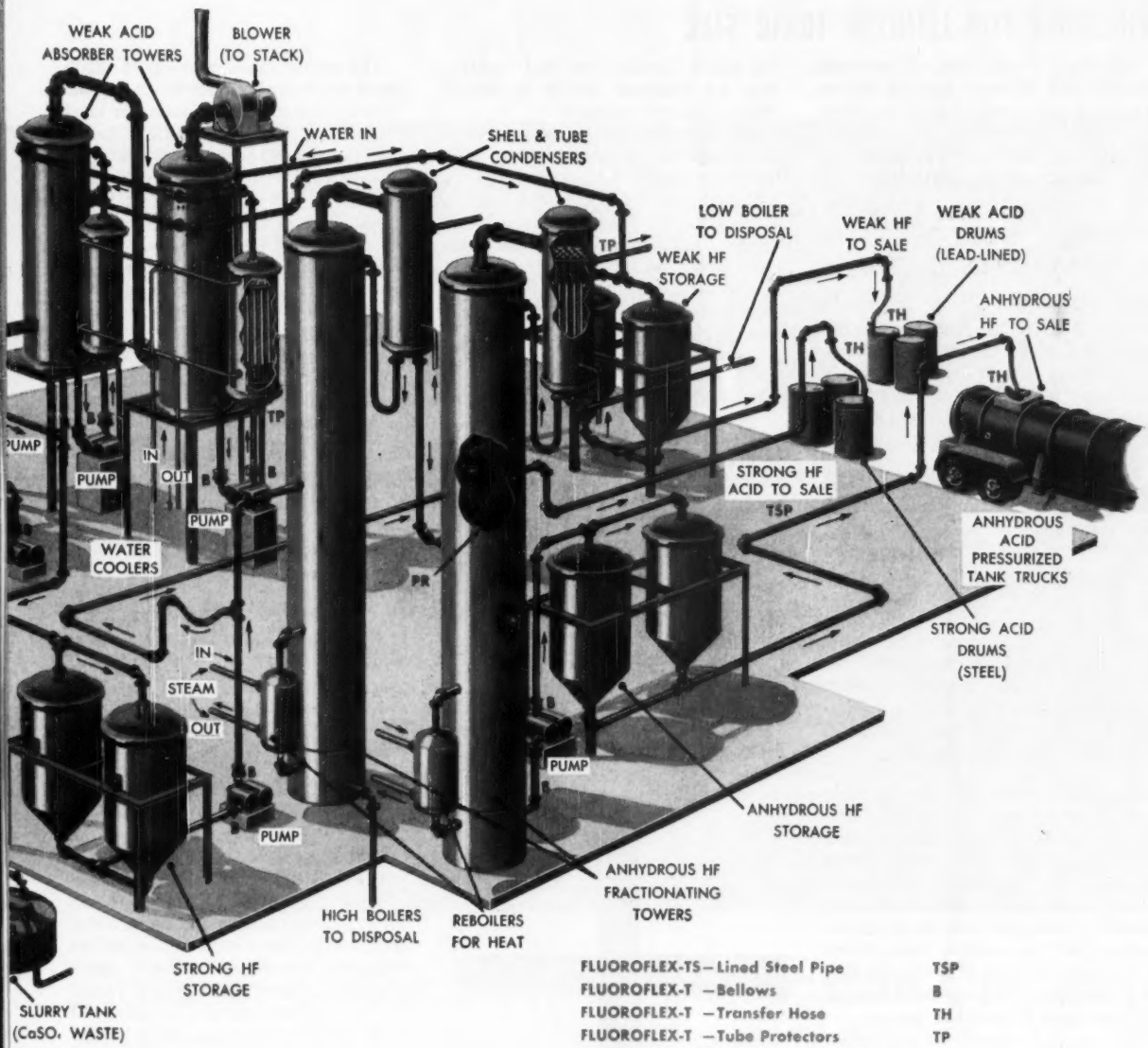
As to the kind of economies possible, one plant equipped with Fluoroflex-T reported savings of $60,000 per month in costs of maintenance, downtime, and product loss!

This in addition to installation economies. The Fluoroflex-T family of corrosion-resistant piping components (see panel at side) have all been designed for complete couplability and hookup ease, in a complete range of sizes to fit any flow, process, or process path.

If *you* have problems of handling corrosive fluids—in cost, equipment maintenance and replacement, process downtime—why not talk them over with Resistoflex? As they have for others, their fully experienced staff of engineers and equipment specialists may be able to save *you* money, time, and headaches! Write for Bulletin today!

Check These Versatile Fluoroflex-T Piping Components for Economy, Installation Ease, Long Process Life!

Fluoroflex-T Lined Steel Pipe: Prefabricated to section lengths, conforming to your blueprint specs, with flanges on and ready to assemble. Minimizes assembly time; shortens checkout time; suitable for all fluids; complete series of fittings and connections available.



FLUOROFLEX-TS—Lined Steel Pipe	TSP
FLUOROFLEX-T —Bellows	B
FLUOROFLEX-T —Transfer Hose	TH
FLUOROFLEX-T —Tube Protectors	TP
FLUOROFLEX-T —Raschig Packing Rings	PR

piping problems, the overall economy proof FLUOROFLEX-T (TEFLON)!

Chemical Transfer Hose: Completely resistant to corrosion; long flex life; available in rubber or stainless steel braid coverings. The answer to all your flex hose problems!

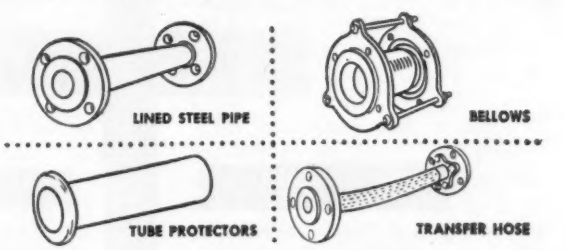
Molded Bellows-Flex Joints: Up to one million flexings without detectable deterioration! Adjust to longitudinal and temperature movements, damp out equipment vibrations. Molded rather than machined, their built-in flex-life can add years to the life of your piping and equipment!

Dip Pipes, Spargers, Thermowells: For non-corrosive nozzle openings, steam nozzles, instrument wells in process equipment.

Condenser Tube Protectors: Eliminate erosion and corrosion of high-velocity acid in entry side of condenser tubes.

And also:

Fluoroflex-T Tower Packing Rings: Light in weight, durable, corrosion and erosion resistant, these economical Raschig rings have only one-fourth the weight of monel rings! Next time you need tower packing, check on these to simplify your tower design, costs, maintenance problems!



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THE CASE FOR LITHIUM: **IONIC SIZE**

Pauling's formulation of univalent crystal radii indicates that the lithium ion is indeed the smallest alkali metal ion.

ATOMIC AND IONIC RADII OF ALKALI METALS (PAULING)

	Li	Na	K	Rb	Cs
M (Angstroms)	1.225	1.572	2.025	2.16	2.35
M+(Angstroms)	0.60	0.95	1.330	1.48	1.69

Lithium's small ionic radius permits shorter internuclear distances between cation and anion. Thus, the lattice or crystal energies of lithium salts should be higher than those of other alkali metal salts. An analysis based on the Born-Haber cycle readily shows this to be true.

The heats of formation of large anion lithium compounds are usually lower than other alkali metal compounds due to lithium metal's high ionization potential and heat of sublimation. But this is not true for small anion lithium compounds. LiF, Li_2O, LiH, Li_2C_2, Li_2S, and Li_3N are all more stable than their other alkali metal congeners. And the freedom with which lithium combines with small anions may well be responsible for its excellent performance in metal scavenging and degassing.

IONIC POTENTIAL The concept of ionic potential (ionic charge/ionic radius) successfully relates the charge densities and deforming powers of the alkali metal ions. Lithium, of course, has the highest ionic potential of the alkali metals, and therefore, the highest free energy of hydration. And a modified Born-Haber cycle shows that lithium in aqueous systems matches cesium as the strongest reducing agent of the alkali metals.

SOLVATION ENERGY High ionic potential is also responsible for the unusual solubility behaviors of ionic lithium compounds. Lithium's high solvation energy favors breakdown of the ionic crystal lattice by solvent-ion interaction. Thus, the utility of LiH and $LiAlH_4$ as reducing agents. Unlike NaH and $NaAlH_4$, they are relatively soluble in diethyl ether, a desirable medium.

One indication of the extensive solvent-ion interaction suggested is the high hydration energy of the lithium ion . . . leading to an increase in lithium ion size in solution. The size increase is due to an adhering sheath of solvent molecules or dipoles. Thus, the lithium ion, smallest of the alkali metal ions in the solid state, is the largest in solution in water.

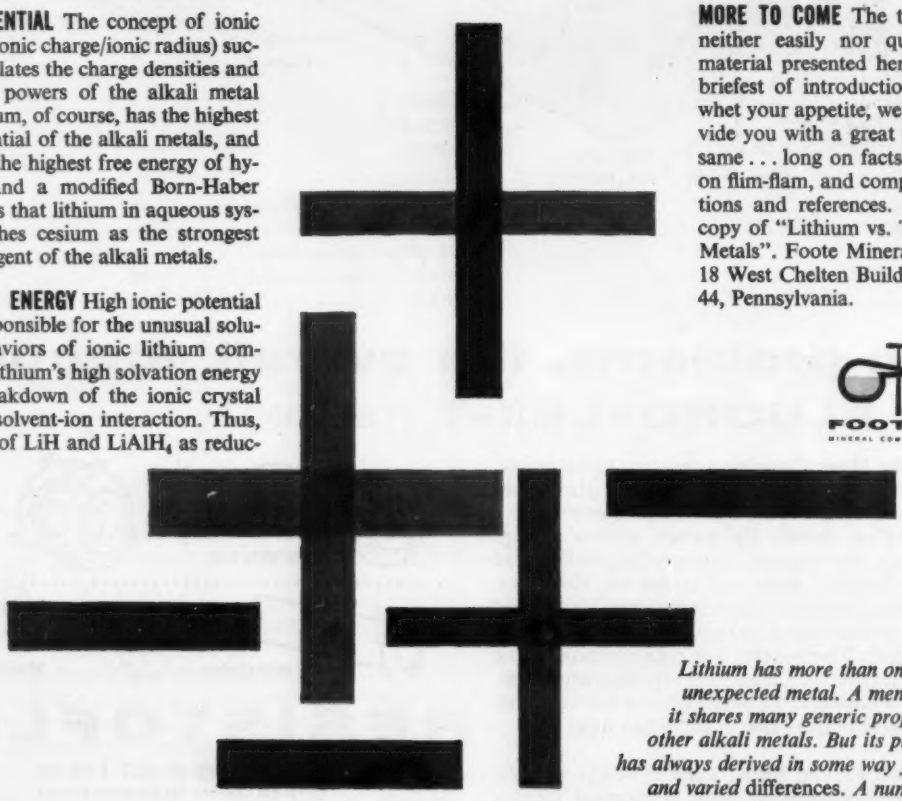
IONIZATION POTENTIAL AND RELATED PROPERTIES OF THE ALKALI METALS

	Li	Na	K	Rb	Cs
Ionization Potential (electron volts)	5.390	5.138	4.339	4.176	3.893
Oxidation Potential (E_o at 25°C, volts)	3.02	2.71	2.92	2.99	3.02
Heat of sublimation (kcal, 25°C)	36.44	25.95	21.52	20.50	18.83
Heat of Hydration of Gaseous Ion (kcal/mole)	123	97	77	70	63

The lithium ion—water dipole aggregates are probably responsible for the severely negative deviations from ideal solution behavior exhibited by lithium salts in solution. Lithium salts yield solutions with abnormally low colligative properties . . . very low aqueous vapor pressures, very low freezing points, etc. . . . as well as the highest stoichiometric activity coefficients of all the alkali metals. For equivalent molar concentrations of alkali metal salts, lithium salts have the highest effective thermodynamic concentrations, the basis for the superior performance of lithium bromide solutions in absorption refrigeration, and of lithium chloride solutions in humidity control equipment.

BOND CHEMISTRY With the highest electronegativity of the alkali metals, lithium has the greatest tendency to form covalent or mixed covalent bond types. Thus, lithium alkyls tend to be much more covalent than corresponding sodium alkyls, and as a result are far more soluble in non-polar solvents. But there is still sufficient polar or ionic character to the lithium-carbanion bond to exert an orienting force on such reactions as the stereospecific polymerization of isoprene.

MORE TO COME The tale of lithium is neither easily nor quickly told. The material presented here constitutes the briefest of introductions. But if it has whet your appetite, we can happily provide you with a great deal more of the same . . . long on facts and ideas, short on flim-flam, and complete with derivations and references. Just write for a copy of "Lithium vs. The Other Alkali Metals". Foote Mineral Company, 420 18 West Chelten Building, Philadelphia 44, Pennsylvania.



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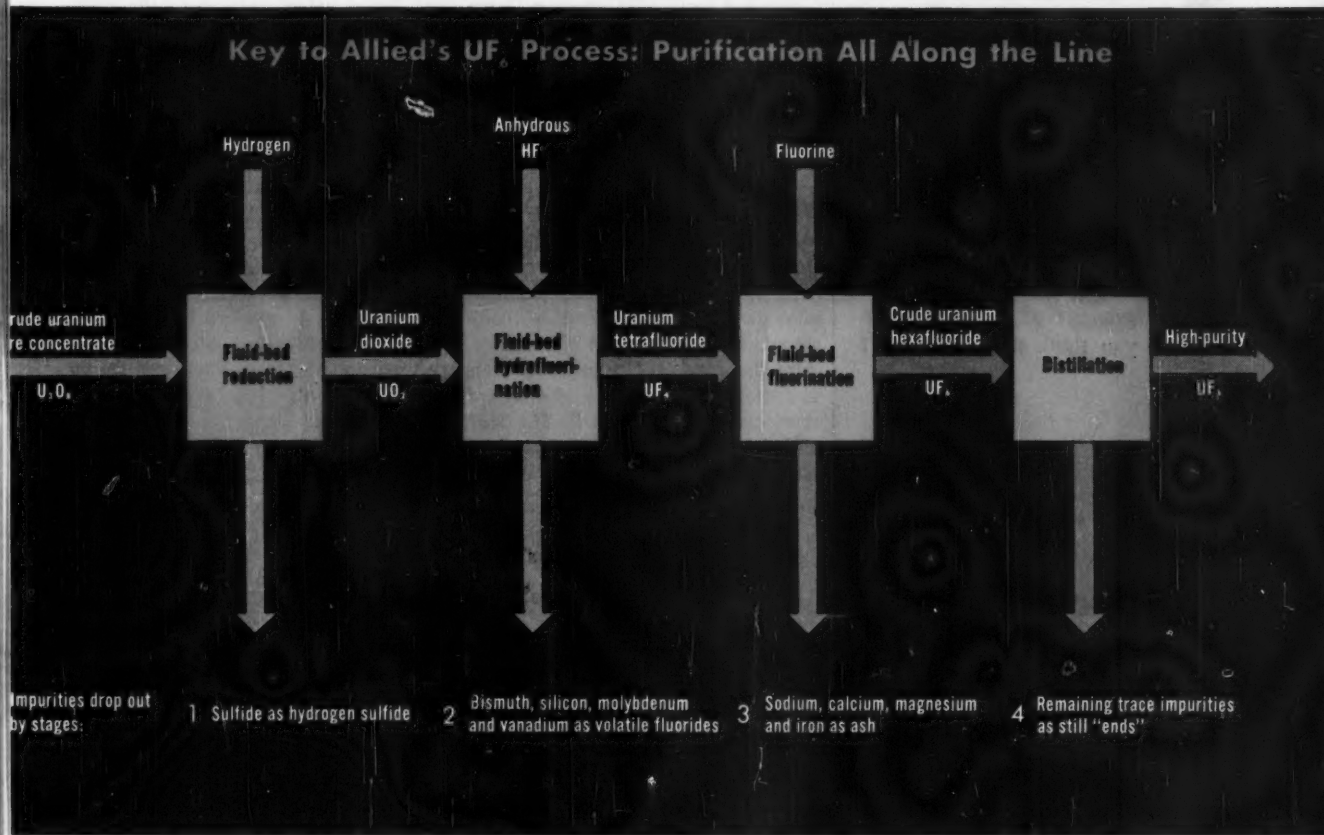
Lithium has more than once been called the unexpected metal. A member of Group IA, it shares many generic properties with the other alkali metals. But its primary usefulness has always derived in some way from its many and varied differences. *A number of the more interesting of these differences are discussed here, all of them related to the fact that, under varying circumstances, lithium has at once both the smallest and the largest of the alkali metal ions*



Fluid Beds Simplify Hexafluoride Cleanup

The growing importance of fluorine chemistry in the fast-changing fields of high-energy fuels and commercial nuclear processing were underscored last week by Allied Chemical's General Chemical Division. Highlights of a report on several phases of General's current activities included: first details of its unique uranium hexafluoride process (diagram pictured above); commercial plans for Aclar, a new fluorohalocarbon film; prospects for fluorine as an oxidizer in high-energy solid and liquid propellants.

Aclar film is scheduled to go into full-scale commercial production early next year at Baton Rouge, La. In addition to its outstanding resistance to moisture vapor transmission (*CW Technology Newsletter, July 2*), the film also boasts superior resistance to most inorganic chemicals—including corrosive acids and alkalis—and flexibility over a 700-degree temperature range from —320 to +390 F.

Continuing government interest in the potential of fluorine-containing propellants is indicated by a one-year extension of General's contract with the Army Rocket and Guided Missile Agency (Redstone Arsenal, Ala.). Allied is carrying out research on high-energy oxidizers for advanced solid fuels.

The company is also boosting halogen fluorides for advanced storable liquid propellant systems. In addition to being able to perform over a wide temperature range, said General Chemical President Frank French, an oxidizer molecule incorporating the fluorine atom offers the best promise for a major performance increase, may boost the range of certain types of rockets by 20-50%. One likely combination: chlorine trifluoride as the oxidizing agent, with hydrazine fuel.

Hexafluoride Route: Turning to its going commercial production of uranium hexafluoride at Metropolis, Ill., the company pointed out several advantages which make its fluid-bed, fluorine processing route simpler and less costly than the older processes. The $11-million plant delivered its 10-millionth pound of hexafluoride last week, is now running at the rate of 6,000 tons/year of UF_6.

The Metropolis plant is the first privately owned hexafluoride facility, and is a prime example of nuclear processing progress resulting from government-industry cooperation. In pioneering the fluid-bed conversion of uranium ore concentrate into hexafluoride, General drew on basic development work done at Argonne National Laboratory for the design of the first three processing steps. But the final distillation operation was General's own contribution, is a vital

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Paint manufacturers: Are the raw material costs in your primer coatings higher than you think they should be?

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Then try Neville's LX 685 resin. This versatile material is designed to extend high-priced phenolics or other expensive raw materials without losing desirable primer properties. LX 685 benefits include increased hardness, lower molecular weight, better adhesion, higher acid resistence and quicker drying time. Our Technical Service Department will help you fit this star performer into your formulae for primers or other types of coatings. Write to us. There will be no obligation.

NEVILLE CHEMICAL COMPANY
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key to the product's higher-than-specified purity.

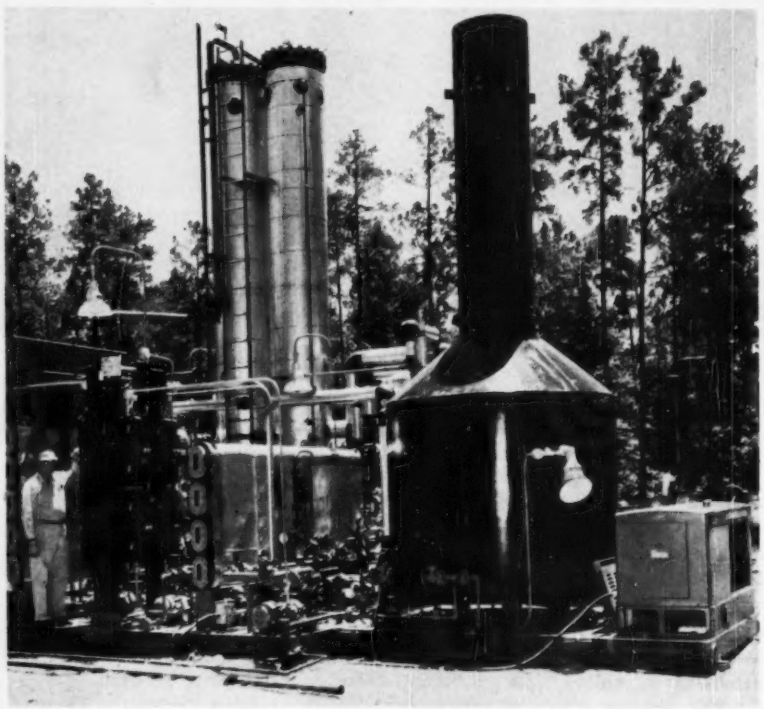
Over-all result of this unique lineup of processing stages: elimination of the complicated and costly ore-refining operations (such as purification by ion exchange in the early stages). Here's how it drops out the impurities as uranium goes from concentrate to product:

Double Duty: In effect, the processing reagents used in each stage serve the dual purpose of removing impurities while converting uranium into the desired intermediate compound. In the first fluid-bed reactor, carefully selected ore concentrate is contacted with hydrogen (dissociated ammonia) at 1000-1200 F. The feed material is selected for relatively low-impurity content and is pretreated by agglomeration, crushing and sizing.

Initial reduction converts the black oxide (U_3O_8) into dioxide (UO_2). Most of the sulfur impurities are removed as hydrogen sulfide in the off-gas, which is burned after it's stripped of solids.

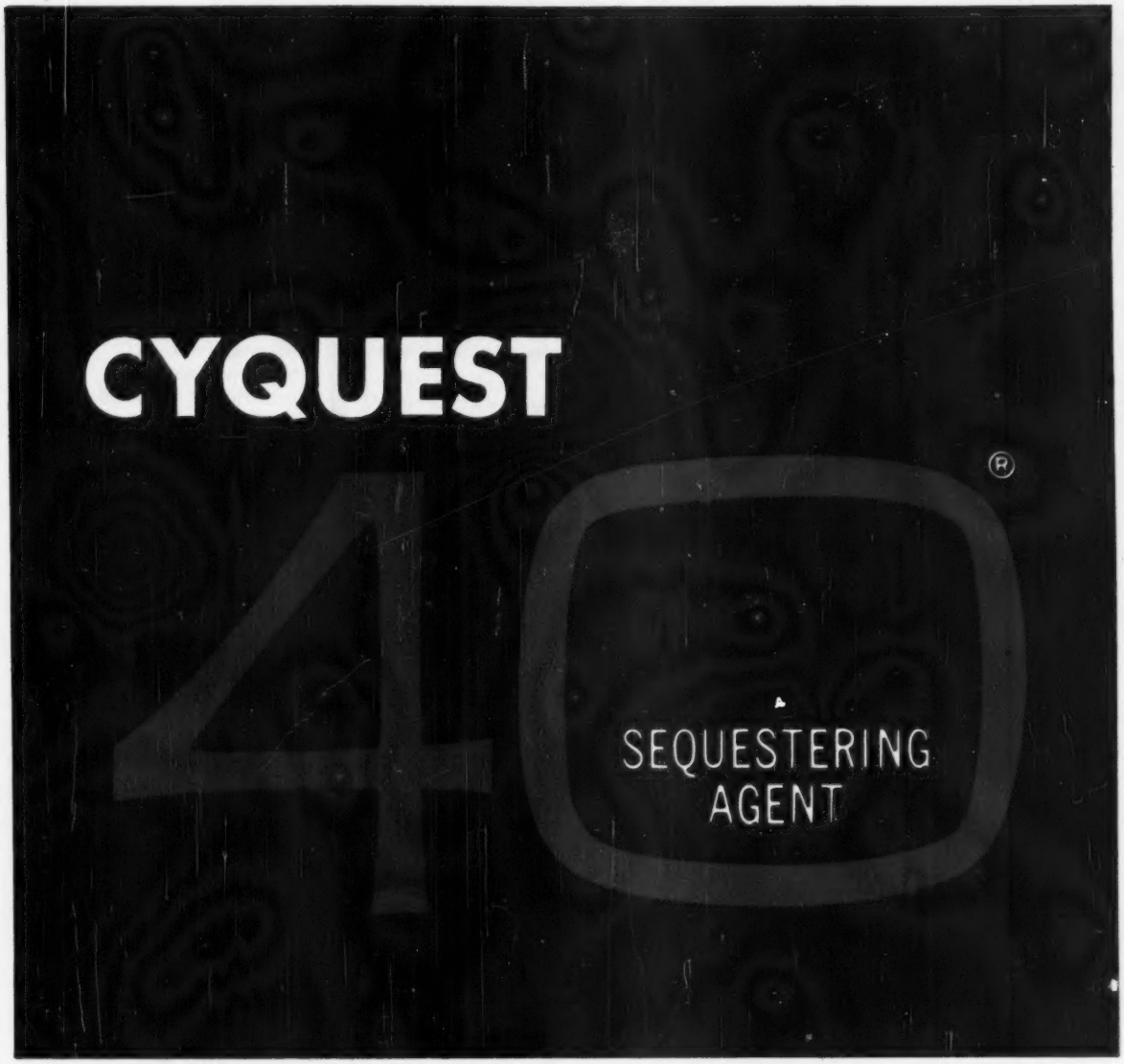
In the second stage, the dioxide is reacted with anhydrous hydrogen fluoride to yield green salt (UF_4) in two successive fluid-bed reactors. Additional impurities, such as vanadium, molybdenum, silicon and bismuth, are simultaneously converted into volatile fluorides, which pass off with the effluent gases. These gases are filtered and scrubbed, then vented to the atmosphere.

Final fluorination of green salt into



Portable Refinery Follows Oil Wells

The workman shown above is standing at the control panel of a novel oil refinery designed by Litwin Engineering Co. (Wichita, Kan.). The self-contained, air-cooled unit includes an electric generator for driving pumps, can be transported on two 30-ft. trucks, will refine at least 200 bbls./-day of 40 API crude oil. Tennessee Gas Transmission Co. will use the refinery to supply fuel for local machinery while prospecting for oil in remote areas of Argentina. Tennessee Gas has already tested the unit on a lease near Cleveland, Tex. Operating costs, under $2/bbl., are almost competitive with those of larger, integrated refineries. Price f.o.b. Houston is $70,000. A complimentary skid-mounted catalytic reformer making 100-octane gasoline can be added for $40,000 more.



CYANAMID

Where metal ions are interfering with purity standards of your product, it pays to investigate the properties of Cyquest 40.

Cyanamid's sequestering agent works rapidly and efficiently—each molecule of Cyquest 40 sequesterant effectively deactivates a metal ion. The resultant water soluble complexes are stable to heat and wide pH ranges. Cyquest 40 can be added to a process whenever an aqueous phase is present. The metal ions will be rapidly deactivated with the complexes remaining in solution.

Cyquest 40 is available in tank cars, tank wagons, 55 gallon resin lined steel drums, and our special 15 gallon polyethylene-lined Liquipak containers. For further information about Cyquest 40, mail coupon today.

AMONG THE PRODUCTS OF CYANAMID'S PROCESS CHEMICALS DEPARTMENT: ACCOBOND® Resins • AERO® Calcium Carbide • AERO® Calcium Cyanamide • AERO® Cyanuric Chloride • AERO® Dicyandiamide AERO® Glycolonitrile • AERO® Guanidine Hydrochloride • AERO® HCN (Liquid Hydrocyanic Acid) • AERO® Maleic Anhydride • AERO® Melamine AERO® Metallic Stearates • AERO® Phthalic Anhydride • AEROMET® Metallurgical Additive • AEROSOL® Surfactants • Ammonium Sulfate CYQUEST 40® Sequestering Agent • Mineral Acids • Aluminum Sulfate
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PROCESS CHEMICALS DEPARTMENT • 30 Rockefeller Plaza, New York 20, N.Y.

CWP-79

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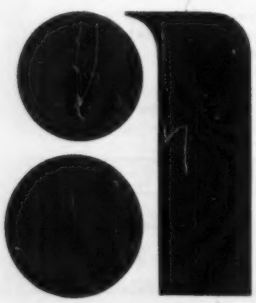
PROPERTY DATA

CHEMICAL FORMULA . . . CH_3Cl
MOLECULAR WEIGHT . . . 50.491
SPECIFIC GRAVITY
Liquid—23.7°C/4° . . . 1.00
20°C/4° 92
Gas 0°C, 1 atmos . . . 1.74
BOILING POINT °C, 760 mm . . . —23.76
°F, 760 mm . . . —10.76
REFRACTIVE INDEX, n 20°/D
Liquid—23.7°C . . . 1.3712
Gas 25°C . . . 1.000703
SOLUBILITY (in cc.) of Methyl Chloride Gas in 100 cc. of solvent (20°C, 760 mm)
Water . . . 303
Benzene . . . 4723
Carbon Tetrachloride . . . 3756
Glacial Acetic Acid . . . 3679
Ethanol . . . 3740



ANSUL CHEMICAL COMPANY, MARINETTE, WISCONSIN ✱ INDUSTRIAL CHEMICALS ✱ REFRIGERATION PRODUCTS ✱ FIRE FIGHTING EQUIPMENT

ENGINEERING

the hexafluoride is done in two fluidized beds in parallel. Calcium fluoride is used to maintain the beds because all of the green salt is converted into gaseous hexafluoride. Side reactions between fluorine and impurities produce an ash containing much of the sodium, calcium, magnesium and iron impurities.

A two-column distillation operation finishes the cleanup job, removing high-volatile fluorides in an overhead stream, nonvolatiles in the bottoms.

The uranium hexafluoride coming from the distillation system tops AEC's quality specifications, says French, contains only about one-third of the allowable 500 ppm. of impurities. This high purity, he added, has proved most advantageous in the gaseous diffusion operations to which the hexafluoride is subjected for isotope separation.

Thermoelectric Team

Latest development in the field of unconventional electrical generating systems is a "dual generator" teaming thermionic and thermoelectric devices. Designed by Westinghouse scientists, it's the first means of tapping the high-temperature heat developed inside nuclear fuel elements.

William Shoupp, technical director of Westinghouse's atomic power department, points out that significant power losses are inherent in today's nuclear power plants. Reason: inevitable heat-transfer losses reduce the 4,000-degree temperatures attained at the center of fuel elements to about 600-degree temperatures by the time the heat is transferred into the surrounding water. To use a greater share of the available heat energy, the new dual generator is built into a fuel element, with the thermionic generator in the center and the thermoelectric generator surrounding it.

Both devices operate on a similar principle, but in different temperature ranges. The thermionic device, which is not efficient below 2700 F, serves as a "topping" element to use the heat in the 3500 F range. The thermoelectric unit operates in the 600-1800 F range, providing a secondary stage of heat utilization. Feasibility has been demonstrated by a one-watt experimental unit; development will now be concentrated on improving the efficiency of the dual generator.

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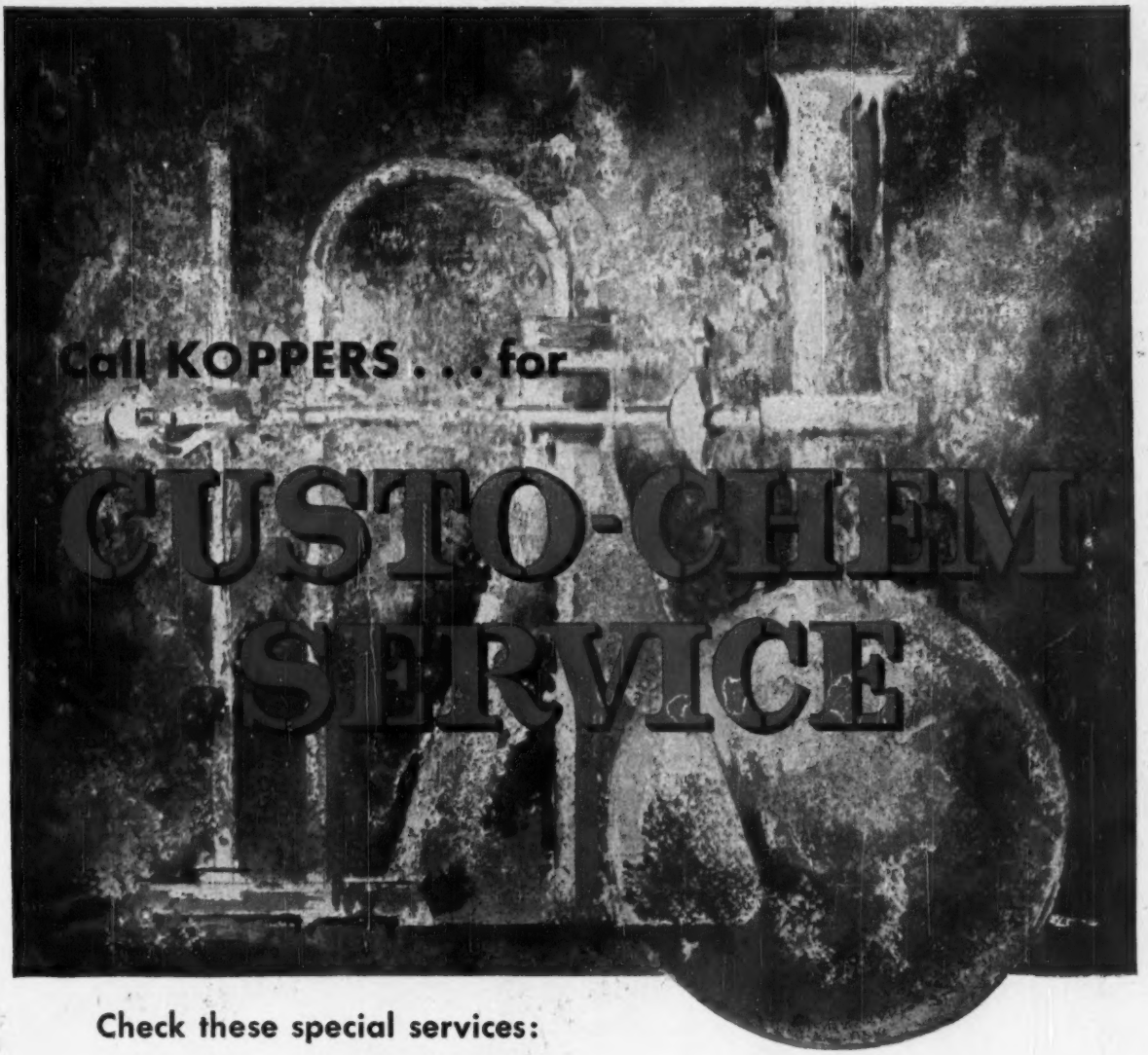

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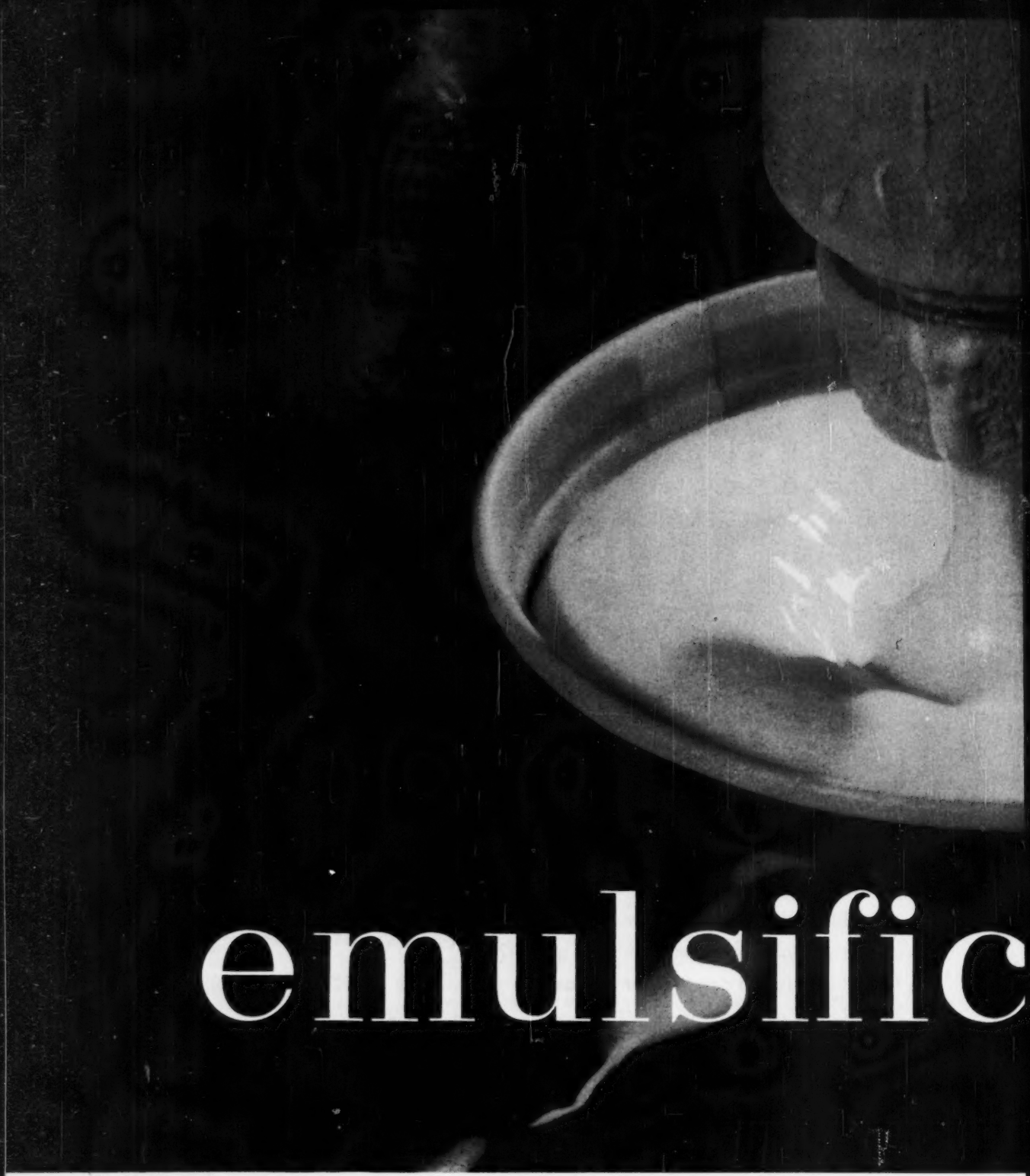

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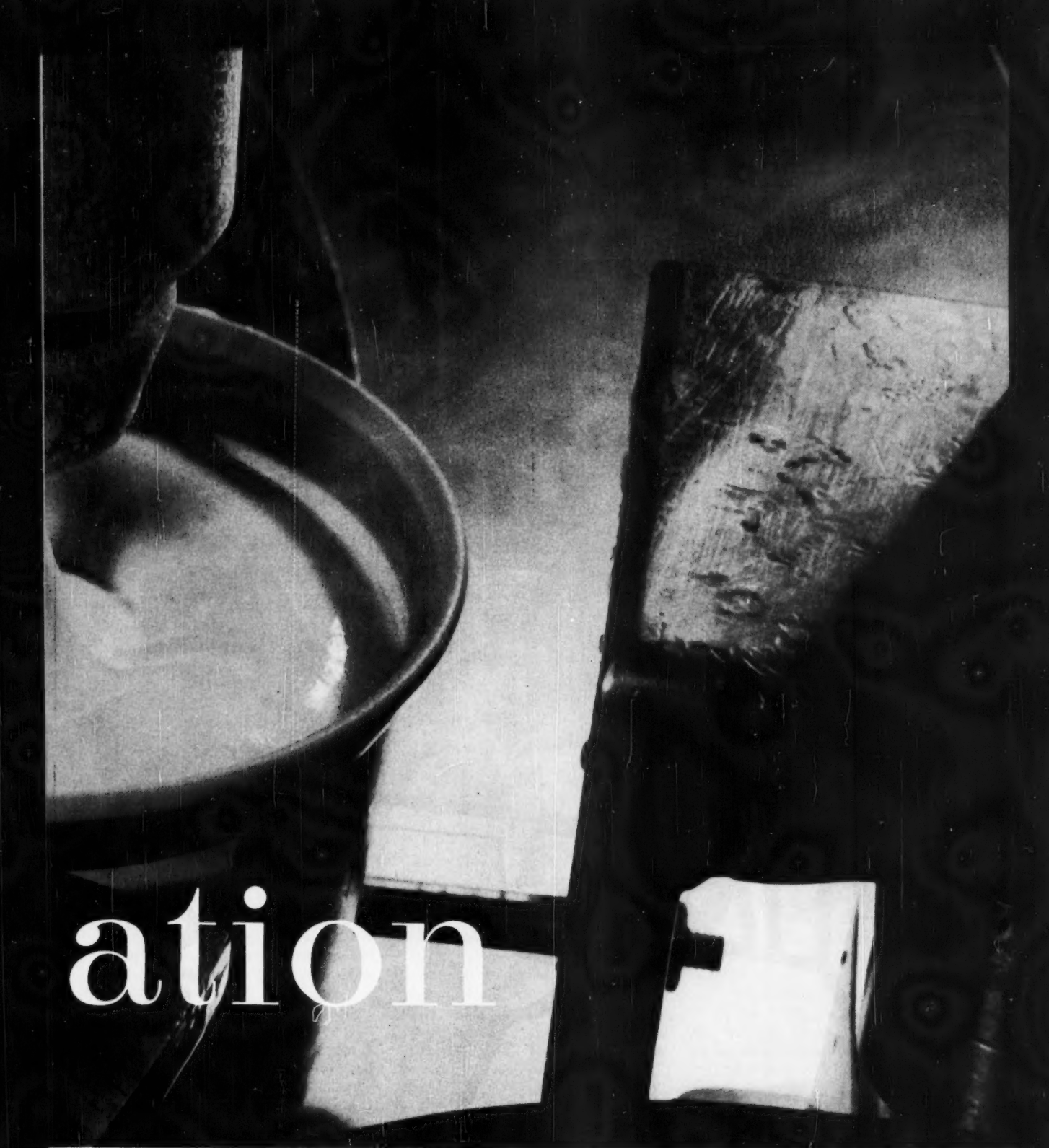

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Mock-up of new building helped management figure office layouts, choose decorative building materials.

Pilot Office Solves New Building Puzzles

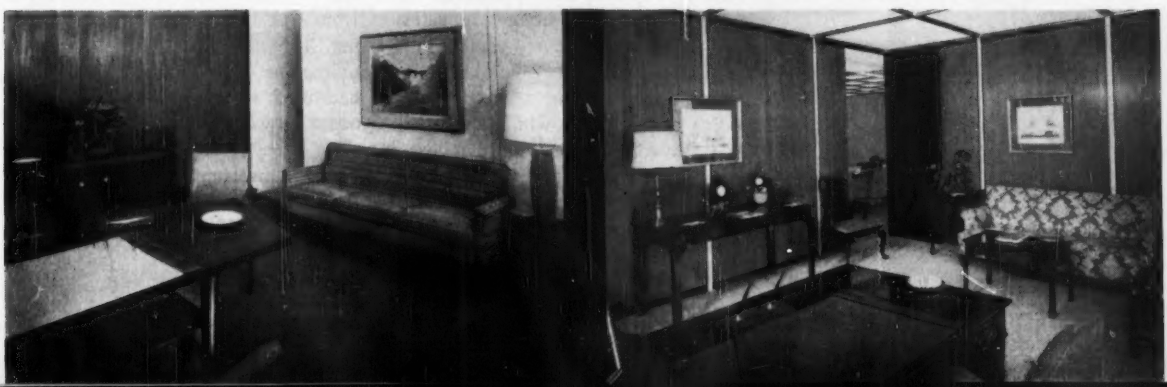
Most of the 800 or so employees who last weekend moved into Union Carbide's new office building on New York's Park Avenue have never seen the structure shown above. Yet it did much to make their move to new quarters an orderly and economical operation. It's a pilot plant of the new Carbide offices.

The idea to pilot-plant came from Carbide's architects—Skidmore, Owings, and Merrill—who figured that a mock-up might save time, trouble and money, particularly in designing a building the magnitude of Carbide's 52-story tower. Carbide agreed that a test facility could help its executives visualize how elements such as windows, partitions and exterior walls would look in the finished building. Interior layouts, worked out and agreed on in advance by key employees, could help smooth the way when moving into new quarters, adjusting to new equipment.

Project Pilot: The mock-up was built on Carbide property near Tarrytown, N.Y., while the New York City building site was being prepared. It represented one-sixth of the area of a typical floor in the Park Avenue building's taller portion—known as the tower. "The area in the mock-up could conceivably be duplicated over 250 times in the new building," says Carbide.

An undertaking of the magnitude of Carbide's new building is beyond the reach of most chemical companies that are currently considering, or actually designing, new office space. Nevertheless, the principle

Contemporary styling was chosen for managers' offices after committees rejected traditional decor.



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of mocking up even a few rooms, or trying out several styles of furniture and decor, could prove as helpful a tool as it has to aircraft designers.

The testing program included studies of both exterior and interior elements. In fact the pilot was built as an elevated structure so that exterior parts could be studied from the point of view of a passerby looking upward. The interior included space for seven typical work areas and a corridor. Six of the areas were partitioned to make up offices of various sizes, and the seventh was used to test layouts for an open clerical area.

Final judgments on the designs and layouts were arrived at in several ways. Carbide's management services division asked a random sampling of secretaries, stenographers and other clerical help to try out various arrangements of furniture and equipment. Their suggestions entered into the division's final recommendations to management.

Final decisions on individual and group office sizes, layouts and furniture were left to top management. The furniture is all contemporary in style. Offices are divided by movable partitions.

Besides answering many of Carbide's personnel placement needs, the building is also a showcase for company products. For example, the wall-to-wall carpeting is of Carbide's Dynel, while furniture paddings are of polyurethane or polyvinyl chloride. Other Carbide-based materials are in lighting panels and wall unit decoration.

Although Carbide won't reveal how much it spent on the mock-up and the subsequent design experiments, it's probable that the shell alone cost some $25,000. Above that, costs would vary widely, depending on the extent to which various designs were tried and on the relative costs of materials. All of Carbide's furniture was custom designed.

The company says the most extensive tests made at the mock-up had to

New Atlas Debuts on Stock Forms

Atlas Powder Co. (Wilmington, Del.) is printing new stock certificates with a "less restrictive" vignette of the mythological Atlas. The old forms showed Atlas holding a box of exploding dynamite, on which appeared "Atlas Powder." But, with the company's emphasis on diversification, particularly into chemicals, the board of directors approved the change to the "new" and less violent Atlas, taken from a 17th century French engraving. The new forms are uncluttered, unlike the old forms, which the firm had used since 1913. They had become crowded with printing on both sides as a result of various charter changes that had to be recorded on the certificates. Cost of new steel engravings: $3,500.

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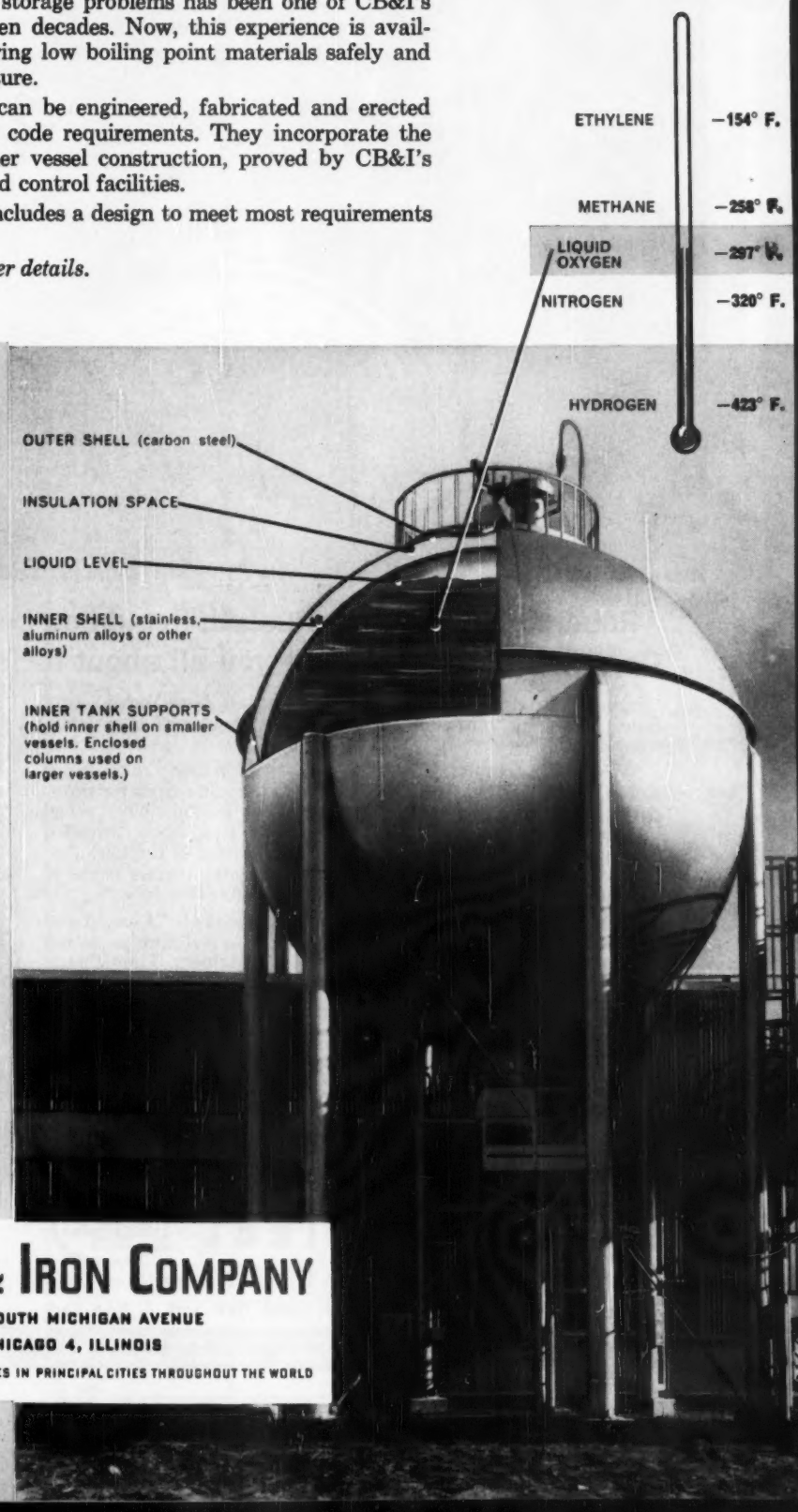

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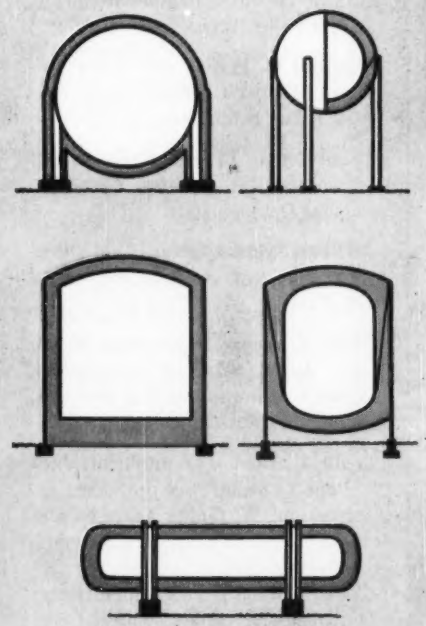

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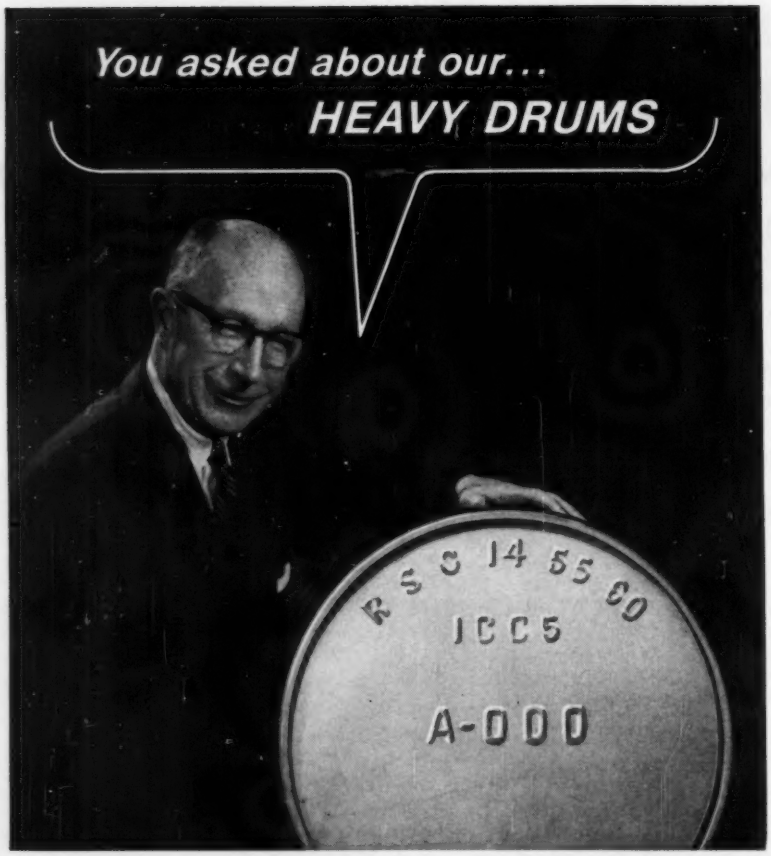

Robert (heavy drum) Russell, Republic Container Salesman, tells you all about it

"Sure, I'm strong on heavies," says Bob Russell, New York District Sales Manager, "but after 30 back-breaking years of experience, what do you expect?

"We make a complete line of 55- and 30-gallon heavy duty drums to ICC-5, 5A, 5B, 5C, 5K, 6A, 6B, and 17F Specifications for transporting dangerous materials. That means our customers can select the combination of size, gage, head construction, hoop, threaded opening, and protective finish (paint, galvanizing, or tinning) that best meets their requirements. We also offer barrels made of Republic Stainless Steel for long-lasting, trouble-free service.

"While I'm on the subject," concludes Mr. Russell, "I would just like to comment on something that I've come to feel deeply . . . that people should always insist on Republic Containers. They should ask their Republic salesman or write to the headquarters in Niles—Container Capital of the World—for details."

Republic Steel Drums, in 20- to 55-gallon capacities, include: Light Gage Class ICC-17E, 17H, 17C, 6J; Heavy Gage Class ICC-5, 5A, 5B, 5C, 17F, and certain ICC-6 Series. Finishes include plain, decorated, hot dip galvanized, hot dip tinned, lacquer lined. *A full line of Republic Steel Packages* are also available from 3½- to 20-gallon capacities—26- to 20-gage plain steel—lined and decorated to specifications.

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ADMINISTRATION

do with lighting. Over 12 types of ceilings were tried, and tests were tied in with experimental installations of window glass of different densities, as well as with selection of blinds and curtains.

Payoff: For Carbide the mock-up gave management a sure knowledge of exactly how the new, 52-story edifice would house offices, furniture and people. As a result employees move into the building each weekend with a minimum of fuss over locations, space and decor.

KEY CHANGES

George LaM. Weissenburger to president, **William C. Keely** to chairman of the board, The Vanadium Corp. of America (New York).

Eugene H. Clapp to chairman of the board, **Amor Hollingsworth** to vice-chairman, **Ralph W. Merrill** to board of directors, Penobscot Chemical Fibre Co. (Boston).

Clifford C. Furnas to board of directors, Hooker Chemical Corp. (Niagara Falls, N.Y.).

Thornton F. Bradshaw to board of directors, Atlas Powder Co. Wilmington, Del.).

William Marks to board of directors, Permanente Cement Co. (Oakland, Calif.).

John J. Emery to chairman of the board, **A. W. Schubert** to president, **William S. Rowe** to board of directors, Emery Industries (Cincinnati).

Paul L. Davies to president; **Jack M. Pope** to senior vice-president, administration; **W. Gould Jones** to senior vice-president, corporate planning; **A. Wayne Elwood** to senior vice-president, international operations; Food Machinery and Chemical Corp. (San Jose, Calif.).

Paul L. Alspaugh to vice-president, Union Carbide Olefins Co., division of Union Carbide Corp. (New York).

Carlo Giraudi to vice-president, technical director; **Richard M. Young** to vice-president, sales; Ultra Chemical Works, Inc., subsidiary of Witco Chemical Co. (New York).

Robert L. Mitchell to vice-president, planning; Celanese Chemical Co. (New York).

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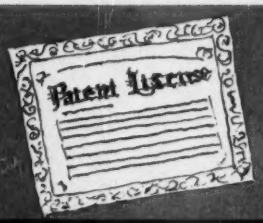

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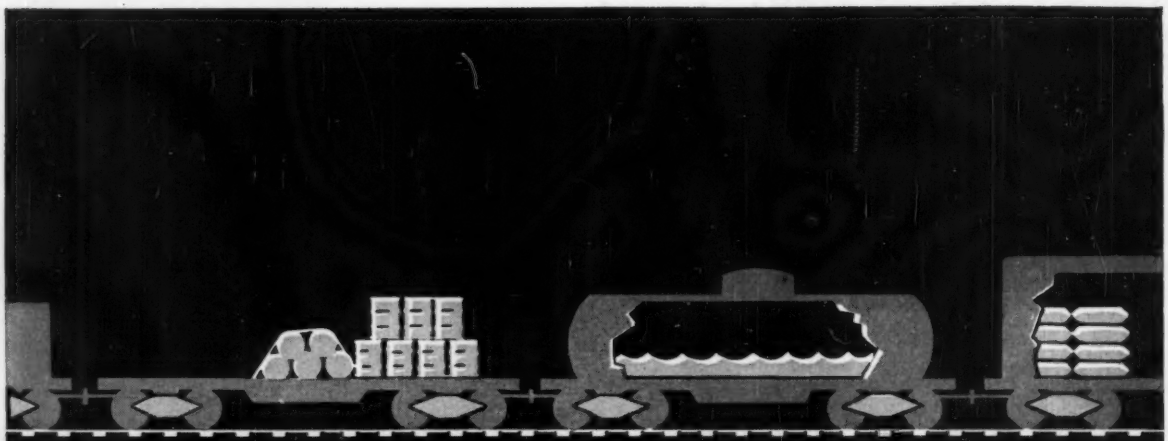

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Shelf-life of paints may be upped by new casein-free latex.

Lifting Lid on New Latex

A new all-synthetic styrene-butadiene paint latex does away with proteinaceous additives and the concomitant need for preservatives. This —together with other improvements —may lure paintmakers despite its 2-3¢/lb. higher price.

That's the hope of Dow Chemical, which is introducing Latex X-3339 as a binder for interior latex paints. Generally credited with development of the first commercially successful paint latex (Latex 512-K in 1948), Dow will be competing with itself as well as others for the 35-million-lbs./year market; the company claims advantages of X-3339 over its own 762-W, one of the big-volume items in the field.

Synthetic Stabilizer: Besides building the latex around a "new and radically different" type of styrene-butadiene polymer, Dow has replaced the usual protein thickener-stabilizer with a methylcellulose thickener.

Paints made with the cellulosic-thickened latex are said to have excellent leveling properties, improved film build and better hiding property, with less titanium dioxide. Tests indicate that it takes only 2.5 lbs./-gal. of titanium dioxide with the new latex to get the same results as protein-thickened paint at 3 lbs./gal.

Paints made with the latex are said to accept higher pigment loadings than do conventional styrene-butadiene systems. Excellent film properties at pigment volume concentrations of 50-60% are cited, and utility paints can be formulated at even higher concentrations, says Dow.

Typical properties of Latex X-3339 (at 25 C) include: surface tension, 31-33 dynes/cm.; tensile strength, 1,500-2,000 lbs./in.^{2}; elongation, 400-600%; viscosity (Brookfield), 200-250 cps.

In terms of a finished paint formulation, the main advantage of the new latex is that it allows the paintmaker to reduce or even eliminate many components from his formula. In a 100-gal.-batch comparison with a conventional paint formula—such as that recommended by Dow for its 762-W—these items would be eliminated: 80 lbs. of casein solution, 40 lbs. of carboxymethylcellulose, and 30 lbs. of bactericide. And these would be reduced: titanium dioxide (200 vs. 170 lbs.), clay (140 vs. 110 lbs.), water (190 vs. 170 lbs.), binder (325 vs. 320 lbs.), and antifoam (7 vs. 4 lbs.).

Raw-material costs, says Dow, would be approximately $1.08/gal., about 9¢/gal. less than that of a conventional formulation despite the latex price of about 32¢/lb. (tank-car), 2-3¢ higher than currently used latexes.

Part of a Trend? The move toward the elimination of casein will have its greatest effect on small, rather than large, paint manufacturers. Asked to evaluate the significance of the new latex, one of the country's biggest paintmakers told CHEMICAL WEEK, "It's about time the latex suppliers recognized some of the problems of competition, namely, that conventional styrene-butadiene latex paints do not fit into the small paint manufacturers' plans. The small manufacturer does not have the facilities to handle protein in the right way, so he turns to other materials and gets into latex paint — but with an inferior product."

Dow, apparently, isn't the only company that has actively sought to eliminate protein from butadiene-styrene latex paints. In a spot-check of latex suppliers, CHEMICAL WEEK found that Borden is readying for the market in the next few months a product using a nonproteinaceous colloid it makes itself. Also, Dewey and Almy Chemical Division of W. R. Grace has a special formulation (at a premium tag) that employs methylcellulose, but it hasn't actively pushed it heretofore. Dow's move, however, may precipitate a little more activity in that area. If it has the effect on the industry Dow hopes it will, paintmakers may find themselves going on a low protein diet for fatter profits.

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The developer of the Process wishes to sell the patent rights and registered trade marks to a responsible company. He also wishes to take a position with the purchaser in the fields of product development, marketing or technical sales. He has 20 years of experience in the manufacturing and marketing of coatings, finishes and adhesives. For complete information write to: Chemical Week, BO-4732.

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SPECIALTIES

Skin-Oil Substitute

A substance closely resembling human skin oils has been developed as a drug base by The Upjohn Co. (Kalamazoo, Mich.). Called Veriderm, the material is described by Upjohn as "a happy medium between the waxy extreme of cream bases and the greasy extreme of ointment bases." It's intended as a base for steroid drugs used in the treatment of skin conditions.

Obviously designed as a replacement for lanolin and petroleum-derived materials, such as petrolatum, the new base is now going into Upjohn's steroid-containing preparation Medrol Veriderm, which is used to treat contact dermatitis, neurodermatitis, anogenital pruritus and seborrheic dermatitis. It's also being used in Neo-Medrol Veriderm, a product which incorporates the antibiotic neomycin with a steroid.

Dr. James E. Tingstad, of Upjohn's Research Division, worked out the new material to closely duplicate human skin lipids—Veriderm has the same amount of free fatty acids, both saturated (20%) and unsaturated (10%), as has the skin. Amounts of saponifiable material (triglycerol esters of fatty acids) are 25% for both. There is a higher percentage of other esters of fatty acids in Veriderm (17%), however, than in skin lipids (15%). The percentages of nonsaponifiable materials are about the same in both; 8% saturated, 5% unsaturated hydrocarbons. There's closeness on free cholesterol content: 3% for Veriderm, compared with lipid's 2-4%. Veriderm has about 12% higher-molecular-weight alcohols (liquid and solid); the figure is 10-15% in skin lipids.

Blast Trigger

A substitute for dynamite primers, useful with modified ammonium nitrate explosives, has been developed by Chromalloy Corp.'s Propellex Chemical Division (Edwardsville, Ill.). The company's new primer-initiator, called Saf-T-Boost Initiator Model 151, is claimed to be safer, surer and more economical than dynamite types.

Main advantages of the primer: it requires no tying, splicing or taping, and it is suitable for any type of blasting. It was designed specifically for ammonium nitrate-fuel oil blasting agents, has a detonation velocity of over 20,000 ft./second.

The primer—plus 29 lbs. of ammonium nitrate-oil mixture—can replace a 30-lb. dynamite primer for less than half the cost, Chromalloy says. Also, the new primer does not become hypersensitive at freezing temperatures.

The Propellex primer is said to withstand rougher treatment without detonating than can dynamite. It is packaged in a cardboard container, weighs 13 oz., is 3 in. in diameter and 2 in. high.

Brownies for Britain

Britons will soon be able to achieve that just-back-from-the-Riviera look without leaving home. Rolls Razor Ltd., English maker of razors, washing machines, and refrigerators, has become a distributor for Man-Tan, Positan and other synthetic browning agents made by Drug Research Corp. (New York). Rolls will first import the products, plans to repackage them later and eventually manufacture them under license. Miss Man-Tan, another tanning agent made by Drug Research, as well as the firm's Relax-for-Eight-Hours tablet, are also scheduled for distribution by Rolls Razor.

PRODUCTS

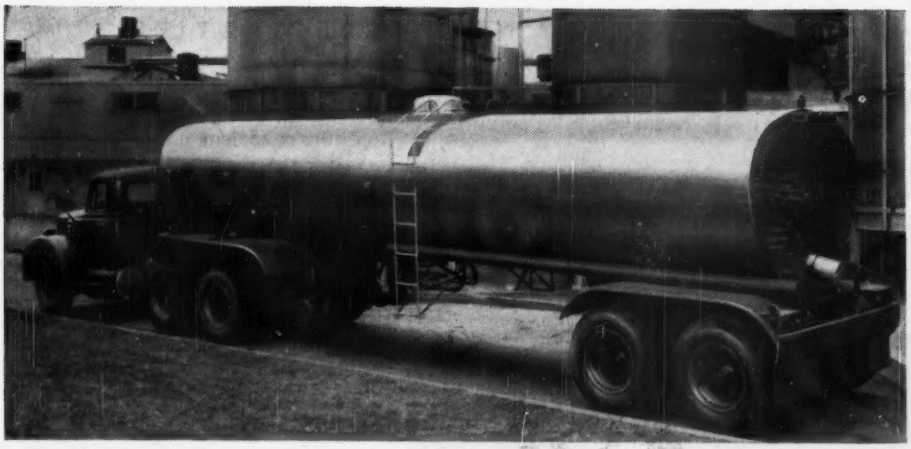
Spray Foam: Dayton Industrial Products Co. (2001 Janice Ave., Melrose Park, Ill.) has developed a liquid spray foam insulation for residential and industrial applications. The foam-in-place urethane, called Stafoam AA-2500, is said to cut installation time in half. Dayton says its product will not shrink, cannot be damaged by mildew or age deterioration, and is odorless.

•

Nopco Thickener: Nopco Chemical Co. (60 Park Place, Newark, N.J.) is producing Modicol VI, a new thickener for natural and synthetic latexes used in coating and adhesive applications. The free-flowing modified ammonium polyacrylate is said to have these advantages: excellent color and clarity, high viscosities at low concentrates, and resistance to yellowing and embrittlement.

•

Sodium Alkali: The Soda Prod-

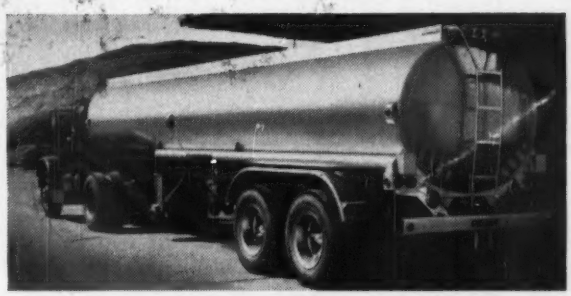


STAINLESS

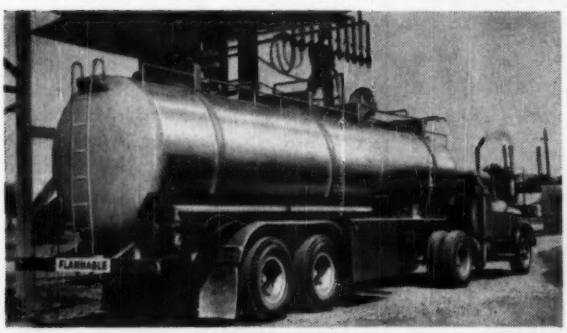
The new all-purpose Fruehauf stainless steel chemical Tank-Trailer is ideal for hauling resins and solvents, as well as phthalic anhydride, phosphoric acid, organic acids, and a multitude of other chemicals. Versatile stainless steel Tank-Trailers cut profitless empty return hauls because they can handle a wider variety of cargoes.

You Can Haul All Chemicals More Profitably In Fruehauf Tank-Trailers!

Professional chemical transporters prefer Fruehauf Tank-Trailers because they out-last and out-earn all others. Constant study helps Fruehauf engineers anticipate the hauling problems of the Chemical industry. As a result, sound construction and advanced designs have produced Tank-Trailers that will give you safer, lower-cost, more profitable hauling for years to come.



STEEL—Fruehauf steel Tank-Trailers are available in capacities up to 5,600 gallons in single compartments, or in multiple compartments for hauling more than one commodity. Fruehauf Tank-Trailers are of flange quality steel construction, scientifically designed for hauling acids, liquid chemicals, acid and alkaline commodities. Tanks also available in stainless steel and aluminum.



ALUMINUM—Lighter weight Fruehauf aluminum Tank-Trailers feature greater payloads for lower cost-per-mile. Aluminum Tank-Trailers have a high resistance to attack by chemicals and will not impart color to critical solutions. Fruehauf aluminum units are available in a wide variety of sizes and styles to meet your particular needs.

"AIRSLIDE" PRESSURE TANK—Lower cost Fruehauf "Airslide"* Pressure Tanks give you faster unloading of powdered chemical commodities such as fluorspar, hydrated lime, and magnesium silicate. Unloads 1175 pounds of tripoly phosphate per minute. Thirty-two foot units with 105 to 115-barrel capacity weighs only 11,115 pounds, complete.

*"Airslide"—Trademark, Fuller Company

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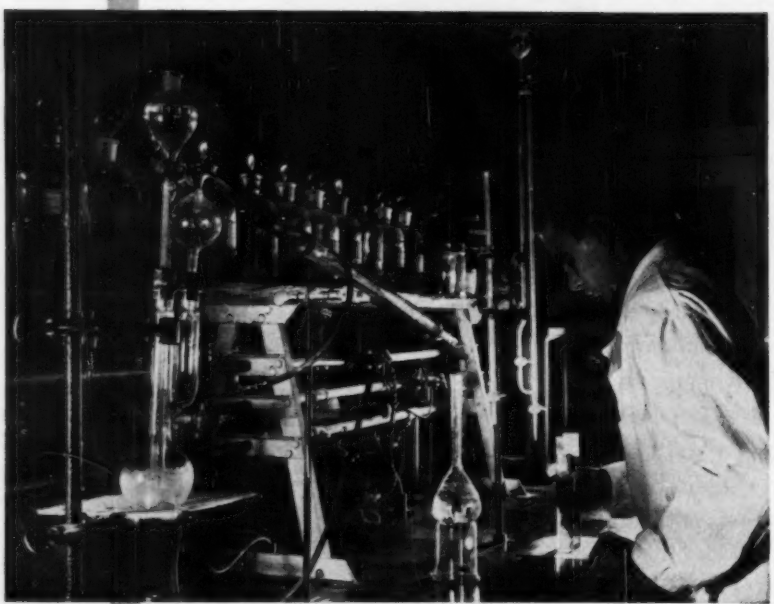

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ALTON, ILLINOIS

ucts Division of Diamond Alkali Co. (Cleveland) is making a new form of anhydrous sodium alkali called Flozan for the household detergent and cleaning compound trade. Flozan, in light, granular, free-flowing form, is said to be highly absorbent, which accelerates its cleaning action.

•

Benzidine Yellow: The Sherwin-Williams Co. (New York) has developed Benzidine Yellow HH 12229, a low oil absorption pigment for lead-free paints. The pigment is designed for use where chrome yellows are not suitable because of restrictions on lead and where hansa yellows will not stand the baking temperatures. HH 12229 is a toluidide type, is not a permanent color, and should not be used for exteriors. Suggested uses: toy enamels, industrial specialties.

•

Wood Flour: Penn-Rillton Co. (New York) is selling a dust-free wood flour called Hygeia Wood Flour. It is designed as a filler for plastics, a cleaner for metal parts, abrasive in soaps, additive to patching materials, and absorbent for greases. Costs: $39.50/ton in carload lots.

•

Mothproofer: A new product to protect clothing and other woolens against moth damage—Moth-Rap—has been introduced by Royal Lace Paper Division of Standard Packaging Corp. (New York). The paper is impregnated with a 0.5% solution of Lindane, is said to be odorless, harmless to human beings and animals. Cellophane-wrapped rolls (18x21 in.) retail for 98¢.

•

Wood Preserver: Osmose Wood Preserving Co. of America, Inc. (980 Ellicott St., Buffalo) has an all-purpose liquid preservative to protect wood against insects, decay, surface moulds, mildew and fungi. The water-repellant Oz Wood Preserver contains Butinox, a liquid organotin compound, produced by Metal & Thermit Corp. The preservative is claimed to be noninjurious to plants and sensitive skin, leaves no residue. It's available in quart and gallon containers.

•

Corrosion Protector: Dearborn Chemical Co. (Chicago) is supplying

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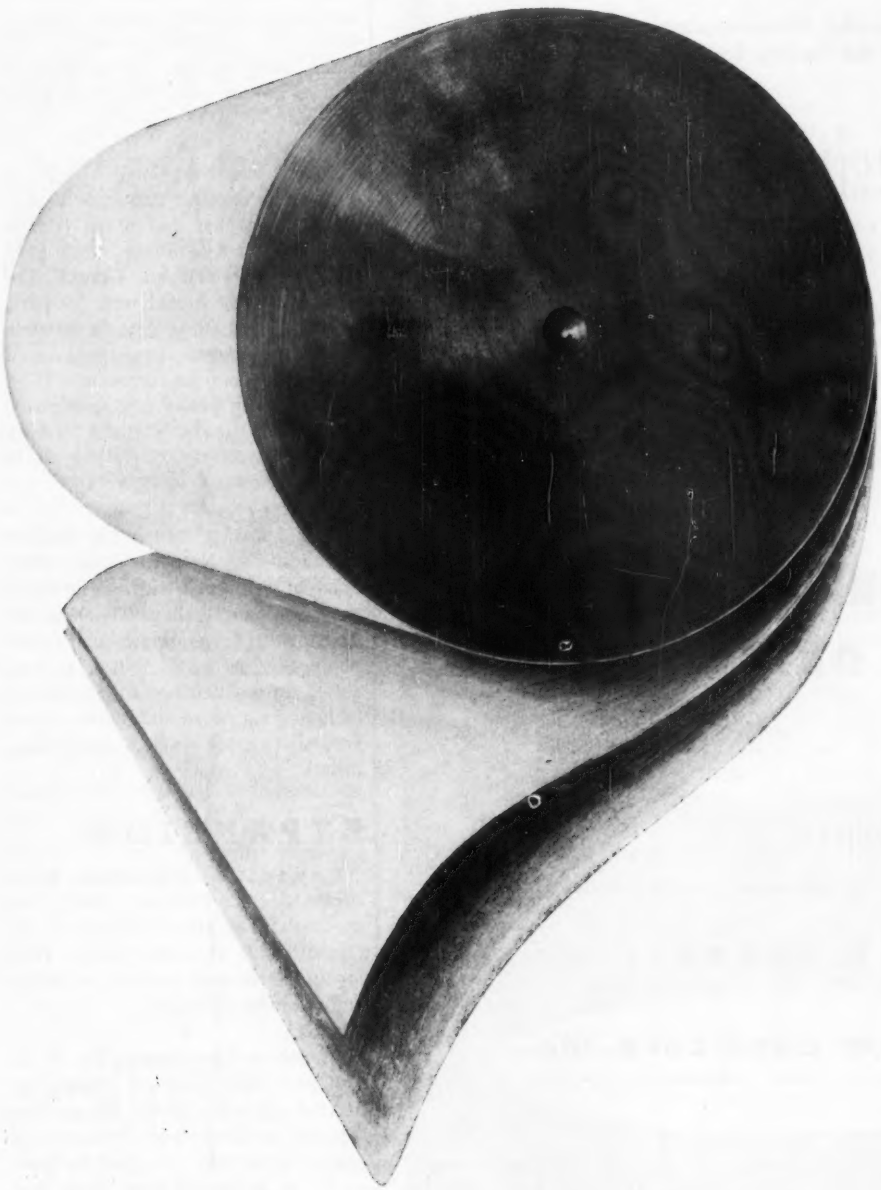

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•

First for Diesels: Oronite Chemical Co. (San Francisco) is now marketing what it claims is the first detergent fuel oil additive developed specifically for diesel injector systems. OFA 265, a mixture of ash-free organic surface-active compounds, is said to provide protection from gums and rust.

•

Rinse Additive: Entek CU-56, a rinse-water additive that inhibits corrosion of copper and brass, is now available from Enthone, Inc. (442 Elm St., New Haven, Conn.). The product, when diluted with 99 parts water, is designed to give an invisible film that prevents tarnishing, staining, spotting-out, pit corrosion. CU-56 is designed to preserve freshly plated or cleaned metal surfaces during storage. Price: $5.75/gal. in 5- to 55-gal. drums.

•

Can Labeling Paste: The Borden Chemical Co. (New York) has developed a high-speed vinyl resin-based paste for can labeling. The new adhesive will be marketed under the name of Cascorez CV-704, is suggested for a wide range of label stock, including varnished and plastic-coated grades. It's available in 5- and 55-gal. drums.

EXPANSION

Canadian Transaction: Lever Brothers Ltd. (Toronto, Ont.) has purchased The Hart Products Co. of Canada Ltd. (Guelph, Ont.). Hart manufactures and markets industrial and specialty chemicals.

•

Branch to Corporation: The H. B. Fuller Co. Inc. (St. Paul, Minn.), industrial adhesives maker, has made a separate corporation of its branch operation in Buffalo. This will be know as H. B. Fuller of New York Inc.

Du Pont DMF and DMAC

DIMETHYLFORMAMIDE — DIMETHYLACETAMIDE

Powerful solvents and reaction catalysts that increase yields and speed reaction rates

Dimethylformamide (DMF) and dimethylacetamide (DMAC) are unusually powerful solvents for both organic and inorganic compounds and frequently demonstrate catalytic effects when used as reaction mediums. Many interesting new uses for DMF and DMAC as chemical intermediates are being discovered. Both are available in commercial quantities.

Catalyst and Reaction Solvent

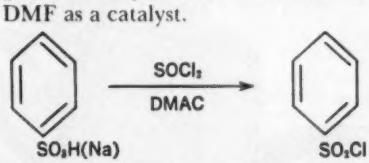
SUBSTITUTION REACTION . . . The catalytic properties of DMF are useful in many substitution reactions, such as in the preparation of phthalic acid derivatives, isocyanates from metal cyanates and organic halides, nitriles from alkyl halides and metal cyanides, and mercaptans using sodium hydrosulfide.

Another example of the use of DMF is in the alkylation of sodium acetylide with n-butyl bromide, where DMF has been found superior to all other solvents tried.

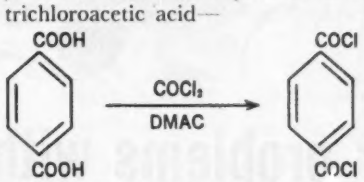
$$CH_3CH_2CH_2CH_2Br + HC{\equiv}CNa \xrightarrow{DMF} CH_3CH_2CH_2CH_2C{\equiv}CH$$

There are many other types of reactions where DMF contributes as a catalyst, such as the Ullman reaction, Gabriel condensations, polymerization, cyclization reactions and sulfonations.

PREPARATION OF ORGANIC ACID CHLORIDES . . . Organic sulfonic acids or their salts can be converted readily to the corresponding acid chloride in excellent yields by treatment with thionyl chloride or phosgene in the presence of DMAC or DMF as a catalyst.



And for converting certain carboxylic acids such as terephthalic and trichloroacetic acid—

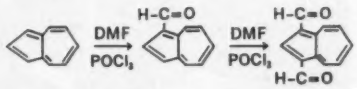


DEHYDROHALOGENATION... Many dehydrohalogenations are carried out smoothly using DMF or DMAC as a catalyst and solvent. For example, dehydrochlorination of 2-chloro-2-methylcyclohexanone to 2-methyl-2-cyclohexenone is easily carried out with DMF and LiCl.

An interesting example of DMF's utility is the selective dehydrobromination of 3-β-acetoxy-5-α-chloro-20-bromobisnorcholan-22-al with DMF despite the relative ease of dehydrochlorination.

Applications in Organic Synthesis

The $POCl_3$-DMF complex is a low-cost formylating agent. An interesting example is the introduction of one or two aldehyde groups into cyclic organic molecules with DMF and $POCl_3$ or $COCl_2$.



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SHELL

Technology
Newsletter

CHEMICAL WEEK
July 9, 1960

Joint research on foam-separation of radioactive wastes was launched last week by Oak Ridge National Laboratory and Radiation Applications, Inc., (Long Island City, N.Y.). The one-year project will cost about $200,000, aimed at improved concentration of nuclides, such as strontium-90, to reduce the bulk and cost of radioactive waste disposal.

Key to RAI's Foamet process (patents have been applied for) is the use of surface-active agents that react selectively with metal ions, cause them to become concentrated in the foam. Some claimed advantages over other separation techniques, such as ion-exchange: lower costs, mechanical simplicity, continuous operation, high selectivity.

Simultaneously with the start of the ORNL project, RAI began current work directed at recovery of cesium-137 for AEC's Office of Isotope Development. The company is also pursuing independent studies on the use of the Foamet process for removal of metallic impurities from solutions, extractive metallurgy and refining, recovery of uranium and other metal values from uranium mill wastes, extraction of metals from sea water. Similar studies on extraction of metals from sea water have been made in South Africa, using Armour & Co.'s Sebba process (*CW, Dec. 19, '59, p. 68*).

•

Surface qualities of sheet steel supplied to the chemical industries are said to be greatly improved by a new process that's keyed to nylon-cord spacers and hot alloying gases moving at extremely high speeds. Wilson Engineering (Cleveland) has developed a machine that inserts nylon cords or metal shapes between layers of coiled commercial sheet steel as it comes out of the mill.

In the new process the opened coils can be annealed in a matter of minutes by blowing hot gases through the spaces. (In customary annealing, coils set for days in a white-hot soaking pit.) And by controlling the chemical composition of the gases, the steel surface can be alloyed, decarbonized or enameled at a fraction of the cost of current production methods.

•

An aid for finding better oils to prevent rust on cold-rolled steel is offered by a new accelerated test developed at Republic Steel's Independence, O., research center. The test produces in one week stains that would take from two to 12 months to develop on steel stored in the field.

•

A radioactive drug incorporating tritium has been used with some success on 20 patients suffering from otherwise incurable malignant tumors, according to physicians in a research team at England's Cambridge University. But they're not yet ready to draw general conclusions. The drug is tritiated 2-methyl 1-1,4, naphthohydroquinone diphosphoric ester tetrasodium salt.

Technology
Newsletter

(Continued)

A heatless plastic-joining technique—dubbed Sewnar—has been developed by Ultrasonic Industries Inc. (Albertson, Long Island, N. Y.). It's said to provide airtight, vaportight bonds in a wide variety of plastic films, synthetic woven and nonwoven fabrics, without causing distortion or chemical changes frequently produced by dielectric or other thermal sealing methods. The key: controlled application of ultrasonic energy (at 40,000 cycles/second) to cause interlocking of molecules on the mating surfaces of the plastic.

UI has formed a subsidiary—Sonadyne Corp.—to manufacture and market its ultrasonic film welders; foresees wide application in the packaging, film manufacturing and synthetic textile industries. One verson of the device consists of a transducer that replaces the needle of a sewing machine for threadless stitching of plastics. Field-tested prototypes are available on a limited basis; production models are expected to sell for about $495.

•

Butadiene-styrene latex that can be used to replace natural rubber in foam products is now being made by a new chemical process that uses an undisclosed "highly active" compound to agglomerate the latex particles. Developer United States Rubber says it's a "more efficient, lower-cost process," does not involve freezing or continuous polymerization, techniques conventionally used to build the size of latex particles. The new latex, called Naugatex J-8174, has 68% solids, is free flowing, results in foam that matches natural rubber in resilience, compression modulus and durability.

•

A 275,000-gal./day sea-water converter for St. Thomas, Virgin Islands, will be supplied by Cleaver-Brooks Special Products (Waukesha, Wis.). The plant will consist of a 28-stage, long-tube flash evaporator, will utilize a new method of feed treatment to prevent scale. The $200,000 contract was awarded by government-owned Virgin Islands Corp., a subsidiary of the U.S. Dept. of Interior. Scheduled delivery date is Feb. '61.

Water from the unit will be used in the municipal system; the unit's by-product electricity will be sold. Water cost (including amortization and credit for electricity) is expected to be just over $1/1,000 gal. The community has been paying $4.50-5/1,000 gal. to have water barged from Puerto Rico.

•

A new live-virus vaccine for preventing distemper in dogs is being marketed by Pitman-Moore Co. (Indianapolis), a division of Allied Laboratories, Inc. Called Tissuvax D-H, it also gives protection against canine infectious hepatitis. The immunizing agent is the first of its kind grown by a new chick tissue technique, features "an insignificant amount of foreign protein." Potential market: an estimated 26 million dogs in the U.S.

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Cyanamid's Mecco (left) and Lewis eye new dyes on acrylic skeins.

New Basics Cut Dyers' Costs

Five new basic dyes for acrylic fibers are now bidding for a share of a market already estimated to be in the 1.5-million-lbs., $5-million/year range. The Calcozine Acrylics, as they're called, are the first in a series of acrylic dyes planned by American Cyanamid—itself an acrylic fiber maker—and are claimed by Cyanamid to be novel in chemistry, comparable in fastness, and simpler in application to most products now available to textile mills.

It is the chemical novelty of the new compounds,* in fact, that is thought to hold the key to the simpler, cheaper application of the new dyes, although Cyanamid has been chary about spelling out the details of the chemistry involved. Nonetheless, trade experts believe that the description of some dyes patented last summer by Cyanamid — "quaternized heterocyclic azo dyes"—pretty well pegs what is new and different.

For one thing, a quaternary ammonium compound retarder, needed by previously offered basic acrylic dyes, is said to be unnecessary with the Calcozines; and second, most of the conventional acrylic dyes now are characterized as being of the anthroquinone, polymethine, or styryl type — and the Cyanamid patent is clearly for an azo dye.

In price, however, the new Cyanamid products offer little novelty—the new items run from $2.25 to $5.10/-lb., roughly the same as Du Pont's Sevron and General Aniline & Film's Genacryl colors.

Slowdown: Cyanamid says its new products are specially suited for pastels, since the color application is easily controlled. Most basic dyes are abruptly taken up by acrylics in the bath, resulting in uneven dyeing unless a retardant such as a quaternary ammonium salt is added. That's because, says Cyanamid, the ends of the acrylic polymer chains contain a negative site for the dye to grasp. The new Calcozines, developed and currently in production at the company's Bound Brook, N.J., plant, are said to require no separate retardant. With Orlon 42 and Acrilan 16, for example, only common salt and acetic acid are used to obtain anything from pastels to heavy shades.

The company also claims the new dyes penetrate the fiber more quickly than do conventional basic dyes; thus, dyeing cycles can be shortened, resulting in further saving. Somewhat paradoxically, this isn't done at the expense of fastness. Cyanamid claims that Calcozines' resistance to light, wet rubbing, perspiration, washing, and the like, is as good as or better than those of other basics.

How much savings do these traits contribute? Cyanamid can't estimate in general terms because dyeing equipment and other factors vary from one dyehouse to another. But the firm believes the savings should be "substantial," particularly in dyeing light shades, where cost of the retardant normally is a significant percentage of the over-all cost (in some cases, 10 lbs. of retardant

* Calcozine Acrylic Yellow G, Yellow 2R, Red 3G, Violet 3R, Blue G.

(Advertisement)
B-A APPOINTMENT

G. E. Batley

The British American Oil Company Limited has announced that Gordon E. Batley will be responsible for the world-wide marketing of sulphur produced at the Company's plants in Western Canada. Mr. Batley's headquarters will be in Toronto.

Mr. Batley, who joined British American at Saskatoon in 1941, obtained his B.Sc. degree from St. Andrew's College of England. He has held several key marketing positions in Western Canada, the most recent being Manager of Direct Sales for the Company's Pacific Division.

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RESEARCH

are used with 100 lbs. of fabric.

Patent Clues: Most of the clues to the new Cyanamid product are to be found in U.S. patent 2,893,816 assigned to the company last summer, on "Polyacrylonitriles Dyed with Quaternized Heterocyclic Azo Dyes." One key passage says, "We have found that azo derivatives of quaternized heterocyclic ring systems having an electron-donating or -releasing group in conjugation through the azo group with the quaternized nitrogen have an exceptional affinity for acrylic fibers, especially those containing no basic comonomers."

Modified acrylics aren't selling in as big a volume as are fibers that contain 85% or more straight acrylic.

Among the patent's claims, typically, is one dealing with polyacrylonitrile fibers containing at least 50% of acrylonitrile dyed with 1-methyl-2-(*p*-dimethylaminophenylazo)- pyridinium salt.

"The affinity of these dyes is so strong." says the patent, "that very heavy shades may be obtained ranging from yellow to red, bordeaux, maroon, red-brown brown, violet and blue shades. At the same time, we have found that these dyes can be used to give very pleasing light shades and that the shades obtained from these dyes have excellent lightfastness with little or no sensitivity to changes of pH . . . dyes of this class, having for the quaternized heterocyclic ring system a pyridine or its homologs and benzo derivatives or a 2-arylbenzothiazole in which the azo group is on the 2 position of the aryl ring, are new dyes of exceptional properties. We have further found two unusual synthetic processes for the synthesis of intermediates for these compounds and new intermediate hydrazines of value."

Key men in launching the new Calcozines (another dye, Calcozine Acrylic Orange 3R is still in the developmental stage) include Charles Lewis, group leader in dye research and Jerry Mecco, research colorist. Lewis, one of three men issued patent 2,893,816, spearheaded synthesis work. Mecco worked out methods for applying the new dyes. About 35 staffers helped in the research and development leading to their commercialization.

There are still some problems facing the Calcozines. New members of the family will be needed to achieve very bright green or red shades. And they can't, as a rule, be used with conventional basic dyes in commercial dyeing formulas. Competitive dyes can, however, be used as shading components in Calcozine formulas.

Though it did not emphasize the point, Cyanamid indicates its new dyes are easiest to use with Orlon and Acrilan fibers and that special steps are needed for coloring Cyanamid's own Creslan acrylic.

The company is launching its new products with a heavy helping of technical assistance. With the entrenched products of Du Pont and GAF to contend with, Cyanamid obviously won't have an easy job ahead of it. But the market is tempting now, and promises plenty of growth—and Cyanamid has been strong in the dye field too long to be disturbed by prospects of a tussle.

EXPANSION

- Haveg Industries, Inc., has completed new plastics, elastomer, and ceramic research and development facilities at its Taunton, Mass., plant.
- Canadian Chemical Co. will erect a $285,000 research laboratory in Edmonton, Alta.
- A new, multimillion-dollar research center will be constructed by Texaco Inc. at Port Arthur, Tex., location of its largest domestic refinery.
- A high-radiation-level examination laboratory will be constructed at Oak Ridge National Laboratory (Oak Ridge, Tenn.) for research on economic fuels and materials for power and test reactors. Cost: $2,649,200.
- The National Bureau of Standards, U.S. Dept. of Commerce, will begin work on site development and construction of the first three building units for new NBS labs at Gaithersburg, Md.
- Dow Chemical will build an exploratory inorganic chemical research laboratory as the first unit of its Ygnacio Valley, Calif., research center.
- Redel, Inc., has opened a new laboratory and test center, emphasizing programs in chemistry and chemical engineering, at 2300 East Katella Ave., Anaheim, Calif.
- Hoffmann-La Roche Inc. (Nutley, N.J.) is expanding the appli-

cations research programs of its two largest divisions, Roche Laboratories and Fine Chemicals Division.

• Lockheed Aircraft Corp.'s California division has opened a $3-million center for plastics development and manufacturing in Burbank, Calif. Lockheed has been making plastic products for captive use since '52, is now entering consumer markets.

• Du Pont has realigned the Research Division of its Industrial and Biochemicals Dept. to put greater emphasis on long-range research.

• Thiokol Chemical Corp. has established nuclear propulsion research facilities at Troy Hills, N.J.

• Continental Oil Co. plans a $2.2-million expansion of its research and development facilities at Ponca City, Okla. Size of the main research laboratory will be doubled; about 135 scientific personnel will be added in the next five years. The expansion will bring the company's investment in research installations at Ponca City to about $8.5 million since 1950.

• Metal & Thermit Corp. has established new and enlarged laboratory facilities for electroplating studies and services at Detroit.

• Palos Verdes Research Park, near Los Angeles, has been officially opened. Great Lakes Properties, Inc. (Rolling Hills, Calif.), wholly owned subsidiary of Great Lakes Carbon Corp., is the landholder and will supervise development of the park as the site for research labs.

• A $992,000 radioisotope development laboratory will be constructed at Oak Ridge National Laboratory (Oak Ridge, Tenn.), operated by Union Carbide Corp. for the U.S. Atomic Energy Commission.

PRODUCTS

New Perchlorate: National Northern Division of American Potash & Chemical Corp. will produce pilot quantities of guanidinium perchlorate at its West Hanover, Mass., plant. The material, stable at 350 C, can be used as an explosive or monopropellant.

•

Vitamin Entry: Fallek Products Co. (165 Broadway, New York 6) is now marketing in this country the vitamin carnitine hydrochloride. Supplier is Takeda Pharmaceutical Industries, Ltd.

Amino Acid: Dow Chemical's Technical Service & Development Dept. is now making developmental quantities of DL-threonine, thus completing its offerings of racemic forms of all essential amino acids. The process used by Dow is licensed from Ajinomoto Co.

•

New Intermediates: Henley & Co. (202 East 44th St., New York 17) has added α-methyl-α-ethylcaproic acid and α,α-dimethylvaleric acid to its list of available intermediates.

•

C-14 Standard: A new carbon-14 standard for use with liquid scintillation detectors is now available from the Radioactivity Section, National Bureau of Standards (Washington 25, D.C.). The standard sample—benzoic acid-7-C^{14} in toluene—price is $27.

•

Wax First: The first commercial white oxidized wax for polish manufacturers is claimed by Bareco Wax Co., division of Petrolite Corp. (St. Louis, Mo.). The product, called Petronauba W, is the result of a new oxidation technique and represents the first of a series of white emulsifiable waxes made from high-melting-point microcrystalline domestic waxes. The product is easily emulsified with small amounts of oleic acid.

REPORTS

These reports are available from the Office of Technical Services, U.S. Dept. of Commerce, Washington 25, D.C.:

• "Research in Physical Chemistry and Metallurgy of Semiconducting Materials" (PB 161353, $1) gives new data on properties of several semiconducting materials, with emphasis on germanium and silicon.

• "Current Review of the Soviet Technical Press" (Order No. 60-21441, $7/six months) is a new weekly publication of abstracted translations of Russian articles in a wide variety of technical fields. With the abstracts, which appear within a month of the original publication, are references to the Russian articles.

• Two new reports of rhenium metal are "The Availability and Properties of Rhenium" (PB 161169, 50¢) and "Implications of Rhenium Research in the design of Refractory Alloys" (PB 161158, 50¢).

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PRODUCTION

◄ NEW WAY to put on a roof: spray-chopped glass and asphalt.

Target: Better and Cheaper Roofs

Last week men armed with strange guns (photo, left) clambered out onto roofs in Chicago and Syracuse and triggered Flintkote Co.'s efforts to introduce a new sprayed-on industrial roofing (CW Technology Newsletter, July 2). The selling points: ease of application that can save over 20% on the cost of roofing and also cut roof maintenance problems.

Flintkote will be demonstrating its roofing in various plants to contractors cities during the next few weeks, trying to get a head start in a field that suddenly has a flurry of activity. For chemical plant management, the activity marks the beginning of an evaluation period to determine whether there is really something new in roofing materials' performance.

The new activity stems largely from the problems that arise as increasing demands on roofing are made by industrial plants. For years the conventional multilayer built-up roof—usually four or five plies of rag or asbestos felt hot-mopped with asphalt or coal-tar pitch (*photo, below right*)—gave satisfactory service.

Troubles began when insulation, to improve worker comfort and in some cases to cut loads on air conditioning equipment, was added to the roofing system. For example, one chemical company requires a minimum of ½-in. vegetable fiberboard insulation.

But the insulation must be kept from effectiveness-robbing moisture —either from high-humidity plant processes or from roof leaks. Vapor barriers, added to protect the insulation, appear to create more problems than they solve — roof blistering, cracking and distortion. Some put the blame on improper air circulation; when the roof can't "breathe" properly, the sun's heat causes pressure buildup under the roofing materials.

Some companies switched to more costly insulation with built-in vapor barriers, such as cellular glass. Aerated concrete is now being used because it isn't friable like glass. Many have since found that protection isn't needed except when the plant processes produce very high humidity within the plant.

Not Grounded: The penchant for using roofs as working areas has added to the problems. Leaks caused by workers installing and maintaining equipment on the roof (e.g., dropped wrenches, pieces of metal that puncture the roofing) are often difficult to find on conventional built-up roofing. Crushed stone or gravel, often on the roof to prevent asphalt degredation, makes it difficult to spot damaged areas. Flashing around equipment is sometimes difficult to seal.

These were some of Flintkote's considerations when it began adapting its Sealzit gun to spraying asphalt with chopped glass-fiber roving, to roofs. Flintkote is able to use conventional roofing materials (glass fibers have often been used as woven mats instead of felts), yet get away from the multilayer system. Its plan cuts installation costs because only three men can roof 15-18,000 sq.ft./day (five men can put down only 8,000 sq.ft./day of conventional multilayer roofing). Flashing is easily covered; the roof is tight but has enough elasticity to take care of expansion and contraction. And, repairs are easily made, Flintkote says, by patching with a trowel.

The asphalt emulsion is stabilized with a mineral (clay) colloid which protects against degradation (although crushed stone can be added if desired), prevents blistering and causes the asphalt to char in place rather than run as cut-back asphalt will during a fire. Drawbacks: it can't be colored except by applying an overcoating; aluminum powder can be added to give a reflective surface, but adds to cost; asphalt doesn't have chemical resistance as good as coal-tar pitch, which is now sprayed only experimentally (and coal-tar pitch can't be used on canted roofs without special formulation because of cold flow).

Du Pont's synthetic rubber combination (neoprene and Hypalon) has chemical resistance in its favor and is easy to install around vents, etc., but cost works against it. In four years of work with the formula on its own plant roofs (Du Pont sells the raw materials only to roofing firms) it has brought the cost down.

But a chemical company that recently installed a neoprene-Hypalon roof says it cost 15-20% more than conventional roofing.

Humble's Enjay Chemical Co. Division is now producing experimental carload quantities of butyl latex that forms an industrial roofing system in combination with glass fiber. It may have a cost advantage over the neoprene-Hypalon system.

Vinyl coatings have been tried, relegated to vapor- and fire-barrier service because they don't have weatherability. Acrylics are too expensive, but might be combined with other materials in roofing systems.

A major factor in roofing supplies yet to be heard from: Allied Chemical's Barrett Division, which says only that it is working on a chemical-type approach (not asphalt) similar to Du Pont's. A good bet: its new system will include insulation because of Allied's basic position in urethane insulation materials. The roofing systems now offered must be applied over insulation.

But one major drawback to any new system is aging. Although accelerated testing helps, all roofing suppliers concede that there is a big difference between tests and actual service life on roofs. Flintkote claims an edge here because, it says, its materials—asphalt and glass—have been in service on conventional roofs for many years. Only time will tell how much of an edge this will prove to be.

OLD WAY: asphalt must be hot-mopped between felt layers.

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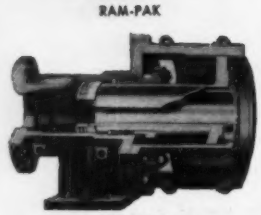

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Market Newsletter

CHEMICAL WEEK
July 9, 1960

Polycarbonate resin production got off the ground last week, as commercial shipments started rolling out of Mobay's new plant at New Martinsville, W. Va. Simultaneously, Mobay moved to cut tabs 32% on the resins, making the new quotes $1.50/lb. in 10,000-lb lots. General Electric, only other company with immediate commercial ideas, is matching the new price. Some observers feel that prices might get down below $1/lb. in the next two or three years.

Although GE is still in the semiworks stage at Pittsfield, Mass., it has a commercial-scale plant under construction at Mount Vernon, Ind. Startup is expected by next October.

Meanwhile, several other firms are showing keen interest in the polycarbonate resin field. Columbia-Southern has a pilot plant at Barberton, O., which has a 1,000-lbs./day capacity. The company is now conducting market research studies, plus sampling and product development work in the field.

Union Carbide has been looking at polycarbonate resins in the labs, is now in the process of studying the market. A favorable report would likely lead to further plans for a commercial venture.

Primary market for the polycarbonates is the electronics and electrical field. Likely other outlets include uses in business machines, automotive, photographic and military applications.

•

Anaconda Co. will no longer market phosphate fertilizers. Under an agreement completed last week J. R. Simplot Co. acquired Anaconda's Montana phosphoric acid and ammonium phosphate facilities. Operation of the 250-tons/day phosphoric plant will be continued by Anaconda on a contract basis, Simplot will market the phosphoric materials, using the Anaconda brandname.

•

Cutbacks in Canadian uranium output are causing a sharp dropoff in sulfuric acid production:

Noranda Mines' acid plant at Big Cutler, Ont., which had been operating at 1,000 tons/day, has been cutting back gradually, is now operating at about 50% of capacity. Canadian Industries Ltd., which supplied three Blind River uranium producers from its new, 200-tons/day acid plant at Copper Cliff, Ont., has reduced production considerably. Nichols Chemical, division of Allied Chemical of Canada, has also felt the effects of the uranium mining slowdown at the Bancroft, Ont., acid plant.

Demand from other major industry outlets has held up well, although some easing has been evident in recent weeks, especially in steel, fertilizers and textiles.

Last year Canada consumed record amounts of sulfuric acid; total is estimated at 1.5 million tons. A little less than half (600,000 tons) went to the mushrooming uranium industry.

•

Expansion of oxoalcohol capacity at Humble's Baton Rouge refinery is completed. New capacity raises the plant's oxo output potential 50%, to 90 million lbs./year.

With completion of the new unit, hexyl alcohol will become commercially available, while other oxo chemicals such as hexadecyl alcohol will be supplied in semicommercial quantities (*CW Market Newsletter, June 11*).

Market for hexyl alcohol is estimated at about 5 million lbs., with the major application primarily as a plasticizer in vinyl resins. Major use for hexadecyl alcohol is expected to be as a detergent raw material.

•

Tentative approval of the controversial helium conservation bill was received from the Senate Interior Committee early last week.

The bill calls for construction of 12 new helium extraction plants to be located on natural gas pipelines. It includes a provision that none of the helium be sold at prices below the lowest tabs paid by any government agency. Two other provisions: that helium-bearing gas remain under Federal Power Commission jurisdiction, and that licensing authority be used solely to prevent the sale of helium for end-uses deemed nonessential or wasteful. (*CW Market Newsletter, June 4*).

A majority of committee members present voted to approve the measure, but because of the lack of a quorum, the bill will not be sent to the Senate floor for action until absentee members can be polled on an amendment offered by Sen. John Carroll (D., Colo.).

Under the Carroll amendment, FPC would be able to consider the sales value of helium when determining the rates on natural gas remaining after helium extraction.

Members of the Senate Interior Committee said that, regardless of the outcome of voting on the Carroll amendment, the bill is expected to be reported favorably to the Senate.

•

Plasticizer production and sales reached a record high in '59, according to preliminary statistics released by the U.S. Tariff Commission.

U.S. output of plasticizers amounted to 524 million lbs.—25.4% higher than the 418 millions lbs. reported in '58. Sales were also up, totaled 462 million lbs. (valued at $138 million), compared with 356 million lbs. in '58 (valued at $111 million). Previous high for plasticizer production was in '57, when more than 442 million lbs. were turned out.

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GOULDS PUMPS

CW REPORT

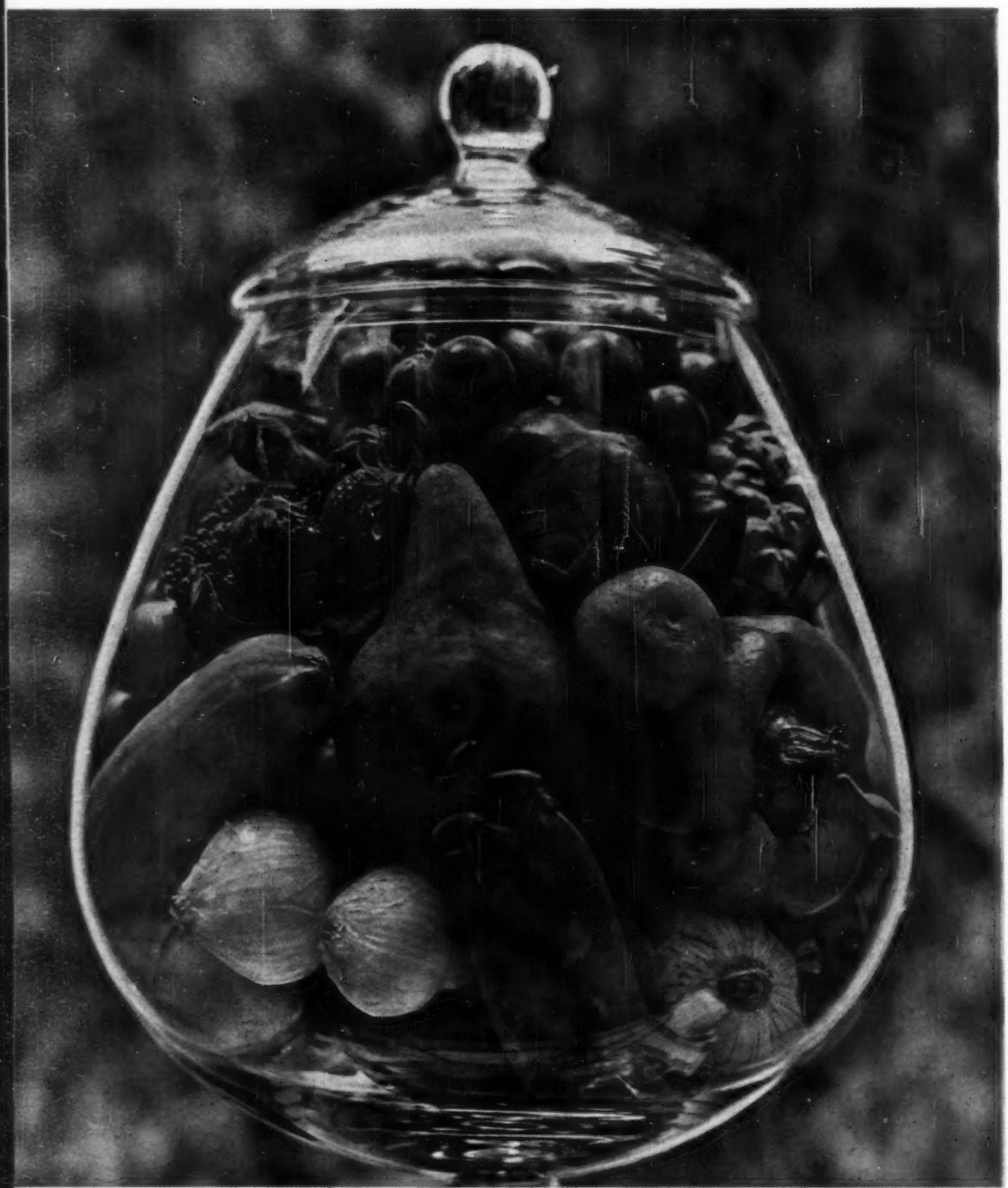


PHOTO COURTESY COLUMBIA-SOUTHERN CHEMICAL CORP.

Today, months after its passage, the new food additives law is still hazy to many chemical men. Here's how to avoid the pitfalls, hasten approval of your products.

FOOD ADDITIVES

by A. Haldane Gee

When on March 6 the new food additives amendment became fully effective as Section 409 of the Food, Drug and Cosmetic Act, maximum controls were put on food additive manufacturers, food processors and food packaging producers.

Now only two courses of action remain for manufacturers seeking to use uncleared additives:

- If the materials were in commercial use before Jan. 1, 1958, requests for extensions may still be filed with Food & Drug Administration Commissioner George P. Larrick. Such extensions may run to March 6, '61, but not beyond. Thus, less than eight months remain for clearing "commercial" materials.
- Where essentially new materials are concerned, a full-dress petition must be filed—and acted upon favorably by FDA—before the product can be used at all.

According to FDA, however, at latest count industry was still dragging its feet in clearing formal presentations. To date, in fact, FDA had received only 156 formal petitions. Of these, a scant 56 had been accepted for filing. Some 58 were awaiting possible action; six petitions had been withdrawn; the status and adequacy of some of the remaining petitions is not yet clear. In 29 cases, FDA says, the substances are not to be regarded as additives. There are, moreover, some 900 requests for extensions (many fewer than expected).

Faced with the unequivocal requirements of a new law, knowing the responsibility for compliance is now wholly his, the manufacturer with an uncleared additive or packaging material may be understandably confused, especially since filing time is running out. His first reaction may be to seek legal advice on his additive problem. Chances are, a better approach would be along more familiar technical lines, backed by a sound knowledge of what's implied and what's spelled out in food additive legislation as it stands today. And that's the information this CHEMICAL WEEK report is intended to give.

Established segments of the chemical and food industries regard the new law as generally favorable. It paves the way for progress in certain technical directions which were blocked by the 1938 Food and Drug Act.

For instance, the industry knows that additives that may be toxic in excess amounts may be useful or permissible in smaller, regulated amounts. Under old regulations, however, these so-called "inherently toxic" materials simply could not be used.

Under the new law they may be used in some instances. The essential requirement for a potentially toxic additive is adequate proof that its use in reduced amounts will be safe for humans—no matter how long the use continues. And under the new law, the burden of proof of such safety rests squarely upon industry. Of course, if proof is lacking, the material can't be used—it's no longer necessary for FDA to prove a questionable product unsafe, deleterious or an adulterant to keep it off the market.

Without question, this means it will be more costly and time consuming for manufacturers to establish a new additive. But despite these disadvantages, the new law has its compensations.

Salient Features: For one, things will get tougher for the opportunists and marginal operators in the food industry. Another plus feature is the prospect of increasing statesmanlike administration of the Food, Drug and Cosmetic Act—cranberries notwithstanding.

Of necessity, FDA will become more of a tribunal on technical problems. Hopefully, this function should become a major one for FDA, making the apprehension of wrongdoers minor. FDA itself describes the change in posture as "preventive enforcement."

This doesn't mean that FDA plans to limit seizures or other restrictive and punitive actions when these are indicated. On the contrary, strict but fair enforcement is envisioned and funds for it have been requested.

It's plain to see that the full operation of the law on

CW PHOTOS—ED WALLOWITCH

A. Haldane Gee (Ph.D., '25—University of Toronto) is director of biological services with Foster D. Snell, Inc., New York chemical consultant firm. His wide background in toxicology, food technology and familiarity with regulatory government agencies well qualifies him to author this article—the end result of several months' study—on the new food additives amendment and its implications. Gee served four years as chairman of the Precautionary Labeling Committee of the Chemical Specialties Manufacturers Assn., three years as managing editor of "Food Industries" (now "Food Engineering").

March 6 left FDA in an unequivocal position. Uncleared additives simply cannot be used unless they are in a recognized interim status that permits their use. Food processors who ignore these facts are strictly on their own.

Important to note: FDA recognizes the desirability of impressing upon the consuming public the need for and value of many chemicals and additives.

Know Your Product's Status

First step for a maker of a food additive is to determine its status under the new legislation. This is not always easy, although products generally fall into one of four categories:

1. Exempt products: certain materials recognized by competent experts as generally safe do not come within the purview of the food additives amendment. For example, "white" lists covering general materials, spices and flavorings have been published in the *Federal Register*. Another white list includes some antioxidants, antimycotics, dryers, drying oils, plasticizers, release agents, stabilizers and other ingredients of packaging materials, especially those used for films, wraps and closures. A tentative white list covering certain trace minerals for animal feeds was withdrawn recently; hence the items on this list are subject to further review.

2. Products subject to regulation: these include specific materials for specific uses which have been spelled out in final favorable actions by FDA. Generally an upper limit in the food product is provided, usually just enough to accomplish the additive's purpose.

3. New materials: these are subject to action taken on a petition for a specific use of the new material. Petitions are acted upon in accordance with well-defined procedures which forbid use of the product until final favorable action has been taken by FDA.

4. Products subject to extension: extensions are granted on a product-by-product basis. Requests will not be entertained on grounds of expediency, nor when any apparent hazard to public health is involved, nor if the product's safety has not or cannot be fixed. Requests for extensions will not carry beyond March 6, '61.

Broad Interpretation: As amended, the law has specific legal effects and wide practical consequences. True, it relates only to food entering interstate commerce. But FDA maintains liaison with state officials, if only to exchange information.

Moreover, FDA definitely will pay regulatory attention to food packaging materials. Under the amendment, materials imparted from packaging are now covered as are materials purposely added to the food.

Another new feature of the law is its total prohibition—no tolerances or permissible residues—of materials that are cancer-inducing for man and animals. Hereafter, suspected materials must be proved safe on this count. In fact, every new additive should be animal-tested for its possible carcinogenicity. Even previously recognized "safe" materials may come under review.

Write for Word: Any manufacturer who desires to use an additive may petition FDA to issue a regulation defining its safe use. Specifically, the petition must contain detailed information on: (1) chemistry of the additive; (2) its manner of use; (3) proposed labeling, if any; (4) necessary amounts and effects intended; (5) a method for determining the amount of the additive in food; (6) the results of adequate investigations with respect to the safety of the material in question.

Closer Look at White Lists

First of the white lists covering substances generally recognized as safe appeared in final form in the *Federal Register* of Nov. 20, '59.

Earlier, a tentative list appeared as a proposed order on which comment was invited. FDA Commissioner

Larrick concluded that materials on the tentative list were recognized as safe with the exception of carbon black, oleic and linoleic acids, titanium dioxide and ultramarine blue. These items were considered separately.

In releasing this list of safe items, Larrick explained that common food ingredients (e.g., salt, pepper, vinegar, baking powder and monosodium glutamate) are generally recognized as safe for their intended uses. He went on to cite about 180 additional items also generally recognized as safe. Included were some chemical preservatives, buffers and neutralizing agents, emulsifying agents, nutrients, sequestrants and stabilizers.

The FDA okay points out that every material listed must be used in accordance with good manufacturing practice, must be food-grade, and may not be used in "excessive amounts."

In line with FDA's policy of making additions to the white lists from time to time, a tentative, supplementary list of 52 general materials was published (*Federal Register*, Feb. 2, '60).

Second White List: A second important list covered spices, flavorings and related materials. As in the case of the general list, a tentative list was published first.

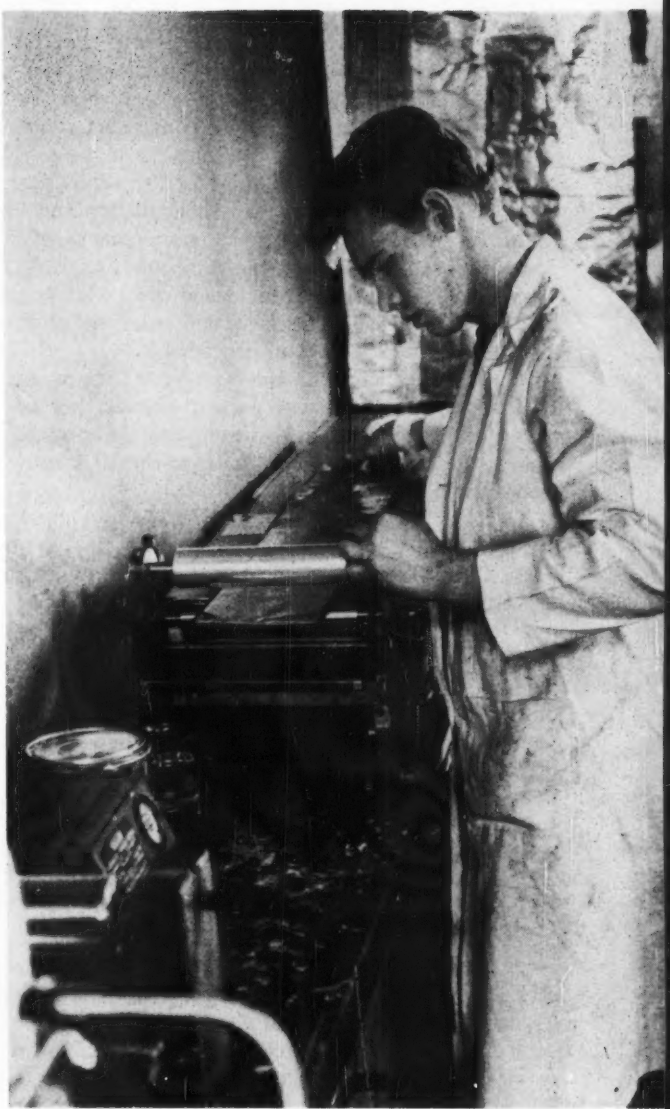
After comment from food processors and others directly concerned, the commissioner issued a further order (Jan. 19, '60) clearing many common spices, seasonings, essential oils, oleoresins and natural extractives generally recognized as safe.

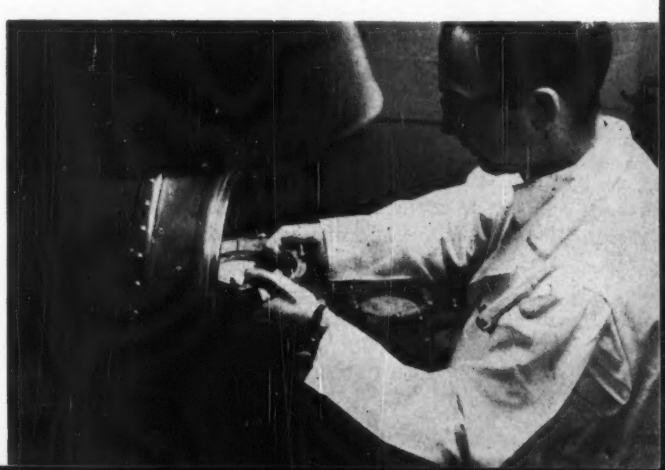
Dropped from the tentative list were: cinchona bark (red and yellow), orris root, orris (concrete, liquid), quinine, wintergreen and methyl salicylate. So far all but the latter two items are regarded as safe, but with restrictions which will be defined by regulation in due course. No final action will be taken on methyl salicylate and wintergreen until pharmacological studies are completed next year.

One of the problems with flavorings is this: most flavoring substances have not been subject to exhaustive pharmacological testing. Knowing this, FDA compiled the exempt list on the basis of expert opinions and especially with the help of the Flavoring Extract Manufacturers Assn.

Trade Secrets Problem: Flavorings raised the problem of trade secrecy since many commercial combinations of flavors are based on private formulations. On this score, FDA has taken the position that all ingredients must be disclosed to it; ingredients' properties must be sufficiently established.

Trade secrecy is protected in that exemptions or other orders may be published separately for each ingredient. This holds true provided FDA is certain the components of a mixture behave the same way as when added separately, and don't react with one another. An





In toxicity tests, can lining materials are applied to rolls of foil (above), which are pressure-extracted, using food solvents (below), preparatory to animal tests.

interesting note on the question of trade secrecy: faced with the new disclosure requirements, suppliers have been more sensitive than food processors. Processors seem more willing to exchange know-how, accept the fact that many so-called secrets aren't secrets at all.

Trace Minerals List: The third of the white lists, since withdrawn, covered trace minerals for animal feeds. It named certain organic and organometallic compounds, 37 in all, including compounds of cobalt, copper, iodine, iron, manganese and zinc. Maximum limits were specified on the basis that excess quantities may be harmful rather than beneficial.

When the tentative list was withdrawn, it was not because the listed products were questioned but because the list was felt to be incomplete. As a result, the entire general subject of trace minerals is being reconsidered by FDA.

Where Packaging Stands

Of all the white lists, the one awaited with most concern named selected food-packaging materials (*Federal Register,* Feb. 2, '60). Among the 84 items included were antioxidants, antimycotics, dryers, drying oils, plasticizers, release agents, stabilizers and other related materials.

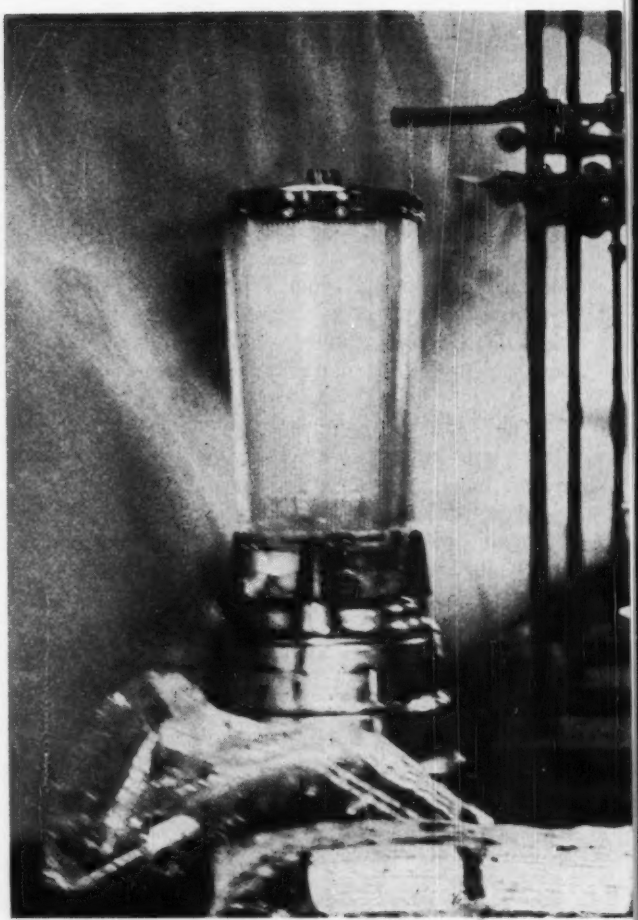
Published as an addition to the regulations, this list of packaging material ingredients was based on prior FDA sanctions. In effect, it applies only when material "migrates" from the food packaging to the food. Migration may be brought about by solution, abrasion or some other means. If the packaging doesn't migrate, it's outside the amendment.

Whether or not the food may be affected will depend in part on whether the packaging material is basically natural (e.g., wood or paper) or primarily synthetic (e.g., plastic film or wrap). But natural base or not, all artificially treated materials, all adhesives or marking materials, including inks, are subject to full scrutiny by FDA if they come in contact with the food via its packaging.

Resins Status: A severe disappointment to many in industry came with the omission of resins from the Feb. 2 list of packaging materials. A delay in sanctioning resins was attributed to problems encountered in evaluating, identifying or describing them.

Later, in March, FDA issued an omnibus extension order covering many types of potential migrants from packaging, including certain resins. This, however, doesn't go beyond March 6, '61 and may be subject to modification earlier than that if FDA feels it has definitive information, pro or con, on any material being used under the extension.

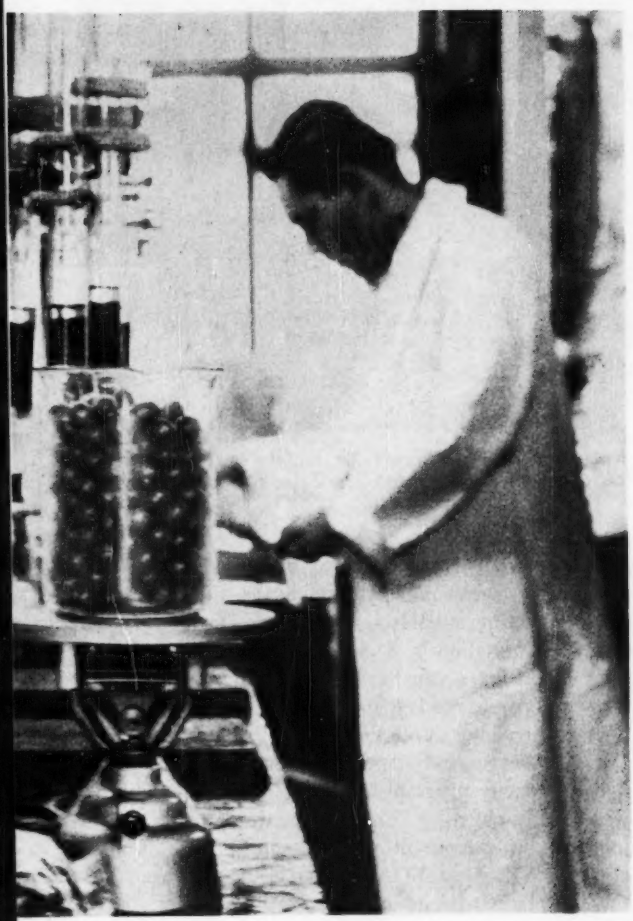
For guides to the action that may finally be taken, manufacturers must go back to prior FDA appraisals, which indicate whether certain materials are likely to be sanctioned. Even so, the prior findings are informal and subject to change.



Sample lots of cranberries are still undergoing aminotriazole

For more background on the relative acceptability of plastic materials, manufacturers should refer to two useful publications. Both are by Dr. A. J. Lehman, chief of FDA's Division of Pharmacology, the government group which provides advice and laboratory proof on toxicity or acceptability problems. The key titles on packaging by Lehman: (1) "Plastic Packaging Materials", *Quarterly Bulletin of the Assn. of Food and Drug Officials of the U.S.,* Vol. XVIII, No. 4, Oct. 1954, and (2) "Food Packaging," same periodical, Vol. XX, No. 4, Oct. 1956.

The earlier publication reviews resins and compounding materials on the general basis of their acceptability, nonacceptability or questionable status. The later article covers resin evaluation, acceptable resins, plasticizers, stabilizers, dryers, drying oils, colorants, release agents, antioxidants, antimycotics, sili-



detection tests in many laboratories across the country.

cone films on glassware, protectants against insects and rodents, as well as some miscellaneous related items. Also included in the list: can enamels, films for wrapping foods, grease-proofing and wet-strength resins for paper wraps.

Migration a Headache: At one time the experts thought any resin with 40,000 or higher average molecular weight could be regarded as virtually insoluble. Later they found that some resins of 100,000 average molecular weight could dissolve in oils and fats. Accordingly, it's now necessary to carefully determine the solubility of each ingredient in every food it contacts, or in specific simpler solvents that simulate food-use conditions.

Although it represents a new complication, the migration problem may be resolved in many cases by following strictly chemical procedures, rather than resorting to animal testing. If the user shows that representative or simulated foods are not affected by the packaging, then he's in the clear. On the other hand, if there is any extract found, it will need to be characterized by its chemical nature, and, if necessary, shown to cause no harmful biological effects.

Compliance Difficult: Makers of some additives fear that compliance with the stringent new law may prove so difficult in some cases that food processors will substitute a packaging ingredient or material that has been declared exempt rather than put up with the approval problems of a new material. More hopefully, food processors may combine efforts in a petition covering a preferred item. FDA encourages such joint action.

Packaging suppliers—if they are under the new regulation—must take care not to guarantee a food processor that his product is in the clear unless he can prove it. Such a guarantee presupposes that the guarantor knows all the conditions of use of his product, and the customer's processing methods to boot. In reality, there can be almost no guarantee of a packaging material for any and all uses.

In a test case a guarantee might save the user of the packaging material from prosecution if he has acted in good faith. But this would not preclude seizure of his goods if they're found to be adulterated. And that would probably end his using that particular packaging product.

General Guides: General guides for chemically evaluating packaging materials have been developed by FDA's Bureau of Biological Sciences. These guides show, in sum, that wood, glass, recognized metals and alloys aren't likely to present any unresolved questions of suitability as packaging materials.

Paper and textiles, however, must be considered to the extent that chemicals are used in processing them. These chemicals may transfer to the food and become contaminants. Adhesives, tapes and inks come within purview whenever they come in direct contact with food. As might be expected, plastic packaging materials are proving the most difficult ones to evaluate.

In most cases, extractability tests are recommended with the food or drink itself being used, or a simulated solvent. For dry, nonfatty foods, special abrasion or contact tests may be employed. In any event, tests should reflect the most extreme conditions of food packaging applications.

Latest Orders

After FDA published the original white lists, it turned attention to a long list of direct and indirect additives. Included were commonly used materials still not generally recognized as safe and not approved for specific uses on a tolerance basis.

These materials were rescued from a "no man's land" by omnibus extension orders. How many of these materials will eventually qualify for "safe" or "tolerance"

status is still another important question.

Most important of the extension lists appeared in the *Federal Register* of March 17, '60. It included over 450 materials that may become components of food when they are used in adhesives for paper and plastic packages, can liners or enamels, or for other purposes involving food production and storage.

Extensions were denied or withheld, pending further investigation, on 21 materials in adhesives and eight materials in the liner category. Many chemical manufacturers and food processors already affected by this order will be further troubled by the orders eventually issued on the list of important materials.

Other Extension Lists: Other extension lists of importance covering direct additives appeared in the *Federal Register* on Feb. 27 and March 17. The first listed 14 materials or combinations which may be used below set limits as emulsifiers, colorants, antioxidants and flavorings, among others. The second list covered 15 materials used in chewing gum manufacture and for protective coatings on fruits, vegetables and cheeses.

Additions have been made to the lists of products which have been either accepted or proposed as "generally recognized as safe." Promulgated for the "safe" list are 67 substances which may become food components as a result of their use in paper and paperboard packages. In addition, 28 other paper packaging materials were authorized as safe by FDA prior to the amendment's enactment; hence no further proof of safety is required for them.

Regular Notices Published: Regularly through June, FDA has continued to publish notices of petitions accepted for filing. As required, these mention the proposed additive's use, restrictions if any, and the name of the petitioner.

Because of the varied and frequently overlapping nature of federal orders, it's becoming increasingly important to canvass the entire record on any prospective additive's use. Additive makers should warn their customers of the pitfall in relying on any composite index of products which may purport to show items that are "safe," restricted or disallowed. Reason: listings may have changed.

In some respects, official actions on additives are beginning to resemble the fine print in insurance contracts, complete with exemptions, exclusions and statutory provisions. This means that manufacturing executives had better tread cautiously when it comes to clarifying the status of any borderline additive.

Toxicity: The Big Question

For packaging materials and direct food additives alike, the question of acceptability hinges on one cardinal question: Is it toxic?

Rats are used extensively for certain types of toxicity tests—e.g., on solvent-extracted can linings (see p. 79).

Newly proposed additives may be only slightly known chemically, even unknown as far as their potential effect on living animals is concerned. Obviously, such limited information is inadequate as a basis for a company's decision about the product's safety. And that's why companies today must often be prepared to inaugurate elaborate testing projects.

Costly Program: For many years, the cost of a full-fledged toxicity program to clear a brand new additive was usually given by FDA as roughly $100,000. With increasing costs on all sides, the figure has jumped closer to $125,000. FDA, of course, does not conduct these contract toxicity tests for manufacturers, but it is in the best position to know these reference costs by virtue of its own extensive tests.

Comprehensive test programs to clear products on the carcinogenic score will frequently cost twice as much as the top figure quoted above. The costs are highest for exotic chemicals, which may call for tests on as many as 2,500 animals, lasting as long as seven years.

It's clear then that the launching of a wholly new additive or packaging material should be undertaken only when the candidates justify the substantial investment. Executives should be content to go cautiously from one testing stage to another, avoiding speculation on any stage beyond the one immediately at hand.

While every petition will need supporting data, the cost of getting it will not necessarily be high. Much depends on what's known about the proposed additive. In some instances, a consideration of the chemistry of the material may be enough. In other instances, a carefully designed experiment with a limited number of animals may furnish the necessary information, especially if there's no reason to suspect the compound as a possible carcinogen.

Rabbits provide severest test methods; animals may die in seconds if material injected into their ears is toxic.

Worthwhile Handbook: Faced with repeated requests for descriptions of recognized toxicological and pharmacological tests, FDA has prepared a 107-page handbook, "Appraisal of the Safety of Chemicals in Foods, Drugs and Cosmetics," of its commonly used procedures. This was published last year by the Assn. of Food and Drug Officials of the U. S.

This worthwhile handbook should be carefully studied by every executive saddled with a food additives clearance problem, especially one in its early stages. Preliminary study may indicate either that time isn't available for developing the necessary data, or that the cost of doing so may be prohibitive.

Cancer, Cranberries and Capons

Like it or not, the Delaney clause ("zero" tolerance provision) of the food additives amendment totally prohibits the use of any cancer-inducing agent in foods. Its mandates are absolute. It absolutely precludes any tolerance limitation such as may be established for other materials.

Whether or not this is a realistic requirement, how long it will take to uncover suspect materials, how one demonstrates total absence of an agent or complete lack of carcinogenic effect—all are debated questions. The fact remains, the law stands until Congress changes it. Until then, the Dept. of Health, Education and Welfare is required to take certain actions which may create problems for the Dept. of Agriculture, as well as for chemical manufacturers.

The effects, in some respects absurd, of the anticancer requirements were clearly seen in late '59 in the cranberry situation (involving aminotriazole) and the capon situation (involving diethylstilbestrol).

Both cases are worth a brief review here because they show the complexity of the problems.

Offending Weed Killer: As the facts evolved in the cranberry situation, action by HEW Secretary Flemming was mandatory. Aminotriazole, the offending weed killer, had been duly accepted by USDA for registration as a pesticide under the provisions of the Federal Insecticide, Fungicide and Rodenticide Act following adequate investigation. A condition of use was the requirement that application be strictly postharvest. On this basis, aminotriazole was applied to cranberry bogs through three growing seasons, 1957, '58, and '59.

Meanwhile two developments took place. Aminotriazole was found to cause thyroid cancer in laboratory animals. Soon after, an analytical method was developed that permitted detection of aminotriazole on fruit in amounts well below 1 part per million. Using this method on some cranberry lots, FDA found residues which suggested improper use of the weed killer on the part of some growers.

At this point, the situation hit the public in piecemeal fashion. Soon after, Flemming called his climactic conference with cranberry growers and packers. Attending too were recognized, and not-so-well-recognized, experts, legislators representing the growers, spokesmen for consumer groups and many others anxious to make capital of the situation.

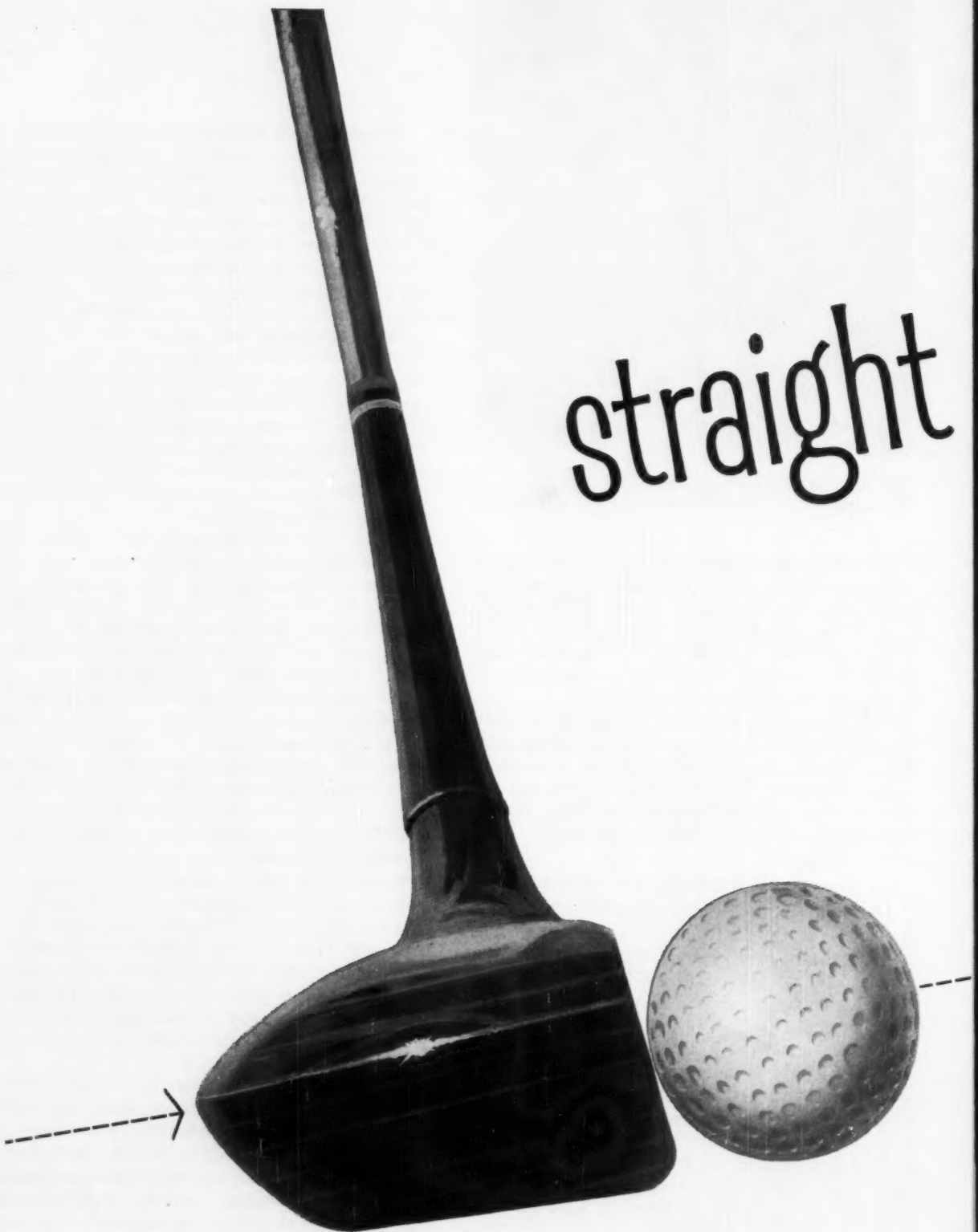
Flemming had to take action. But what action? The problem of decision was complicated by many factors, not the least of which were the myriad points of view to be taken into account. These ran the gamut: consumers should not be exposed to contaminated materials; every provision should be made to protect the cranberry industry; everybody is entitled to uncontaminated cranberries, etc.

Actually, the outcome resulted in an arrangement with the growers and distributors to divide stocks into lots for sampling and subsequent analysis in accordance with FDA-approved methods. As a result of a tremendous effort on the part of government, cranberry growers, food distributors and independent laboratories participating in the crash analysis program (*see photographs*), the bulk of stores were, or will be, released as free from contamination.

Capons Were Quieter: In contrast with the cranberry affair, the situation with caponized poultry was handled in a quiet, more orderly manner. Most important, manufacturers were brought in early for consultation.

The case was another example of carcinogen prohibition. Here an estrogenic hormone, diethylstilbestrol, was being used to effect partial caponization of young cocks.

Diethylstilbestrol was a known carcinogen but was allowed on a "no residue" basis. The original allowance was via a new drug application—not the Delaney prohibition, which allows no carcinogenic additive to be used. Use of the drug on a no-residue basis had been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approved by FDA for modifying cattle as well as poultry. The belief was that there would be no residues in meat or poultry. Refined analytical procedures showed no detectable residues in beef. But the livers of treated chickens were found to contain 20-30 parts/billion of residues, and the skin fat, 35/100 parts/billion.

Resolution of the problem came in December by arrangement between USDA, FDA and drug manufacturers. Treated poultry were identified and separated; diethylstilbestrol distribution was restricted by manufacturers to uses other than for poultry.

Thus, a second issue on additives was handled diplomatically, promptly and without recourse to legal procedure. Hopefully, this will be the pattern of future regulatory actions.

Difference of Opinion: The reason for the legal exclusion of carcinogens is not entirely a question of technical protection, popular opinion or legal overenthusiasm. There's a difference of opinion on the part of experts.

One school contends the "not any" clause is valid on the premise that one wrong molecule in a susceptible cell will start the cancer process. The other school contends that even with carcinogens, there must be a "no effect" level. So far, the question hasn't been resolved. Until it is, the consumer may well be overinsured, at a substantial hidden cost.

In one respect, the Delaney clause will occasion some highly practical decisions. Suspected carcinogens will be evaluated as quickly as possible; other additives will be re-examined in time. Over the years, valuable information should result. In fact, in time, cancer-inhibiting agents may be found as a by-product of the effort.

Strict Enforcement Ahead

While the expectation is that it may take as long as four years to work out all the kinks in the food additives amendment, the prospect is for progressively effective, increasingly strong enforcement.

FDA's 17 district offices will be joined soon by an 18th opening in Dallas. Department plans call for a special staff of 121 additional personnel to work on the additives program. Some 87 of them will be pro-

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CW REPORT

fessional employees, including administrative personnel, special inspectors and technologists in the biological and physical sciences. The others will be clerical and support personnel. Of this added force, 71 will be stationed in Washington, 50 in the field (33 of them inspectors).

Penalties Unchanged: Penalties provided in the Food, Drug and Cosmetic Act remain unchanged. The central prohibition as far as the new food additives amendment is concerned is against adulteration or misbranding of food entering interstate commerce. As of March 6 of this year, food containing either uncleared additives or those not made the subject of a regulation is to be considered adulterated. Penalties may include seizure of goods, fines or imprisonment.

For a first violation, the misdemeanor penalties include imprisonment up to one year, a fine of not more than $1,000, or both. A violation following a first conviction may result in imprisonment up to three years, a fine up to $10,000, or both. The assumption is that a second violation is willful, whereas the first may be inadvertent.

Pattern Set

Although the food additives amendment contains what might be considered drastic provisions, the food and chemical industries have already shown that they can adjust to the rigid climate. The pattern was set in '54 when the pesticides chemicals amendment (based on the Miller bill) became Section 408 of the Food, Drug and Cosmetic Act.

Under "408," manufacturers have learned to live with "no tolerance" or "zero tolerance" situations. During the past five years, about 2,100 tolerances or exemptions have been established for over 100 pesticide chemicals on a specific product-specific crops basis. This development has gone forward smoothly.

It's fair to assume, judging from experience under the pesticides amendment, that life under the food additives amendment will be favorable and free from major upheavals.

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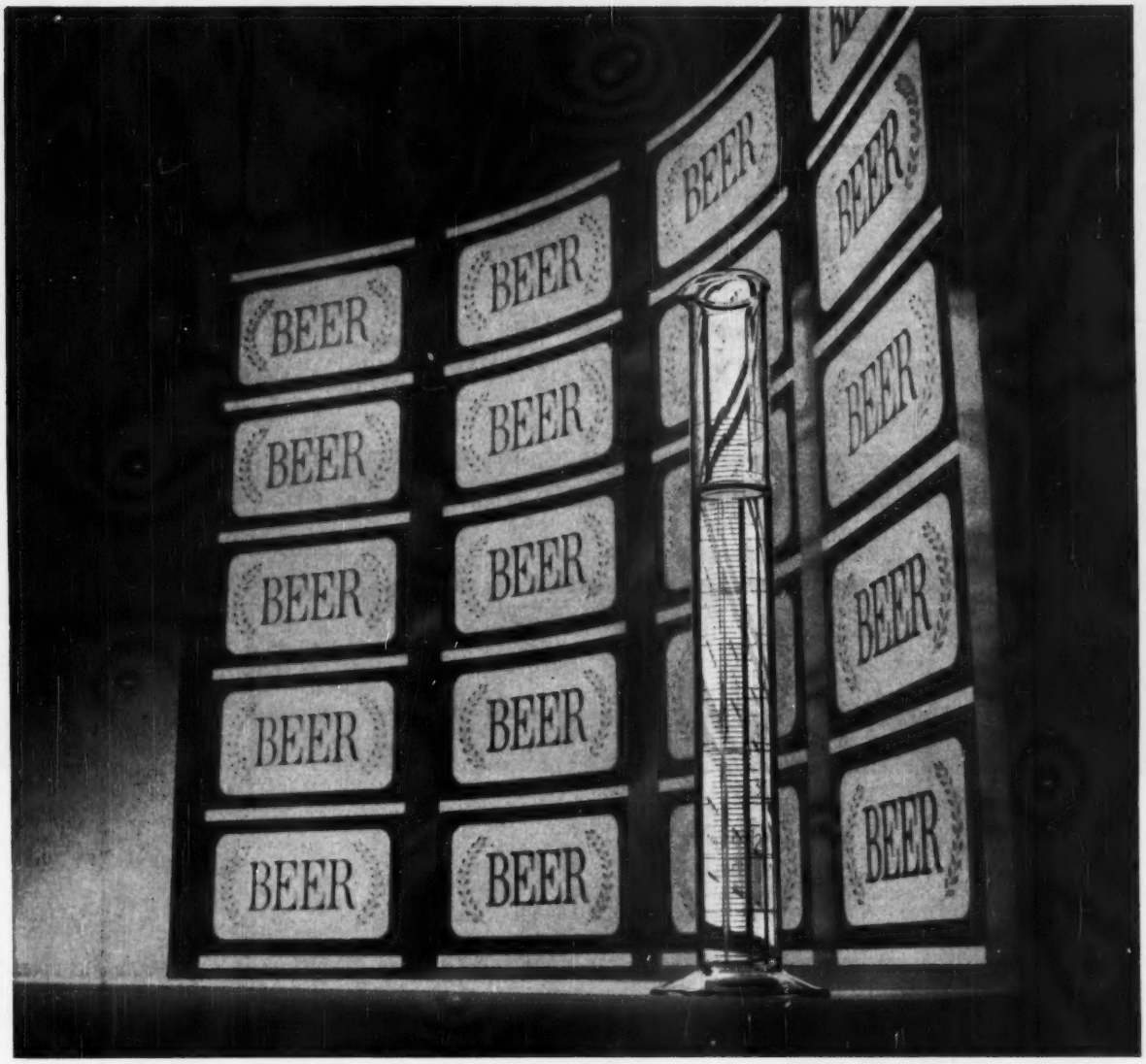

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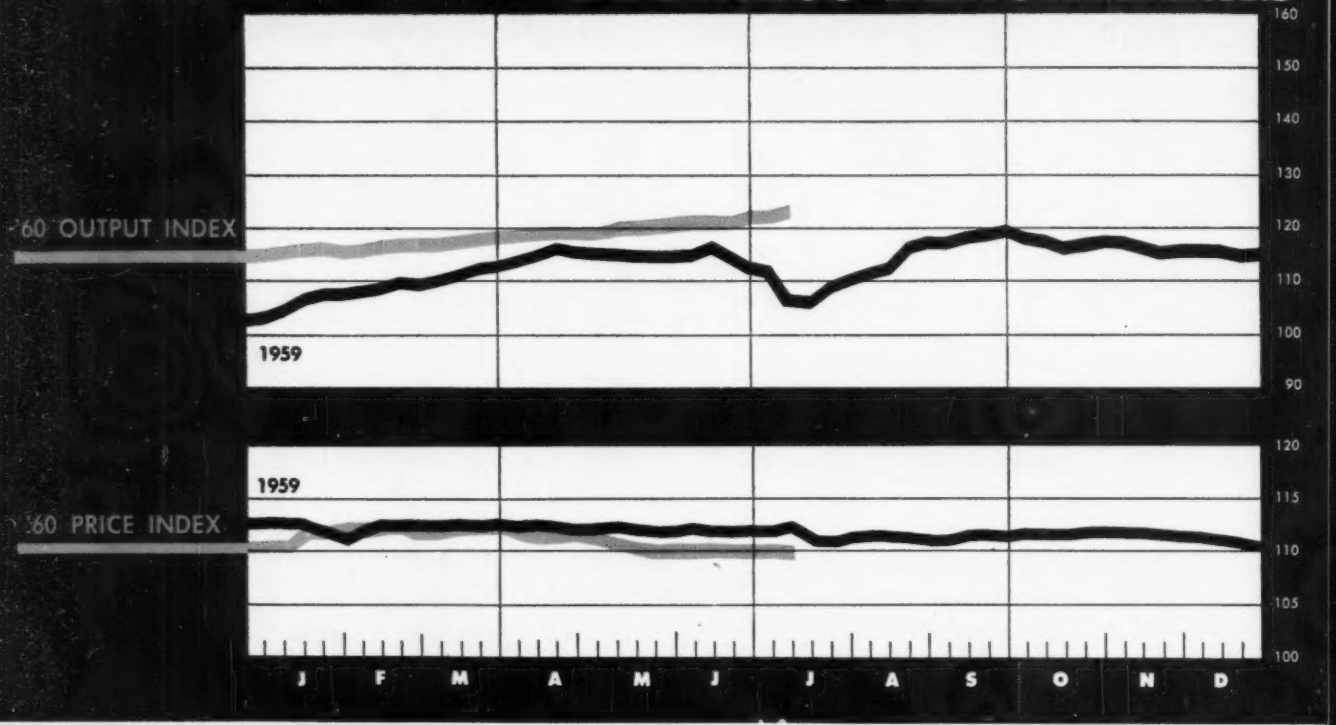

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Chemical Week output index (1957=100)	123.0	122.4	112.9
Chemical Week wholesale price index (1947=100)	108.0	108.2	111.9
Stock price index (12 firms, Standard & Poor's)	51.64	51.69	58.67
Steel ingot output (thousand tons)	1,560	1,739	2,215
Electric power (million kilowatt-hours)	14,213	14,053	13,749
Crude oil and condensate (daily av., thousand bbls.)	6,820	6,840	7,025

FOREIGN TRADE INDICATORS (thousand dollars)	Exports			Imports		
	Latest Month	*Preceding Month*	*Year Ago*	*Latest Month*	*Preceding Month*	*Year Ago*
Chemicals, total	150.6	146.5	119.5	34.0	37.6	31.2
Coal-tar products	17.5	15.1	8.5	4.4	6.4	6.2
Industrial chemicals	27.8	27.4	17.2	11.2	12.0	7.8
Medicinals and pharmaceuticals	23.9	23.1	23.6	2.3	2.2	1.6
Fertilizers and materials	7.8	11.3	8.5	13.9	14.4	13.2
Vegetable oils and fat (inedible)	11.6	7.4	15.7	8.0	5.4	8.3

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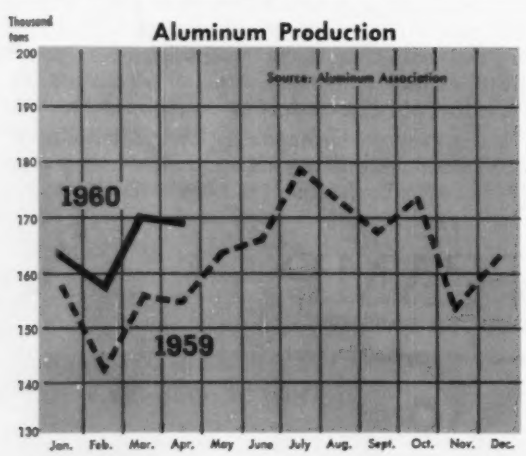

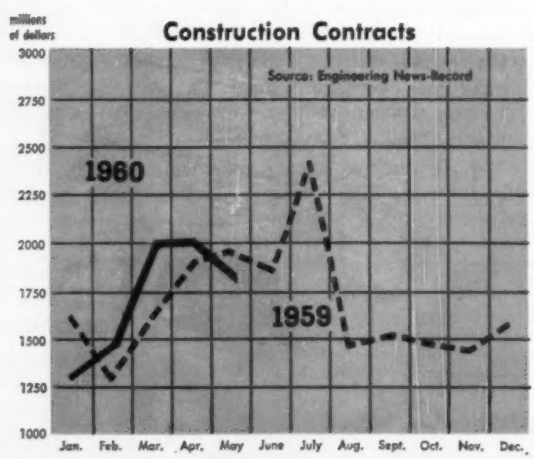

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ADVERTISING STAFF

Atlanta 3.....Michael Miller, 1301 Rhodes-Haverty Bldg., JAckson 3-4951

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Chicago 11.....Alfred D. Becker, Jr., R. J. Claussen, 520 N. Michigan Ave., MOhawk 4-5800

Cleveland 13....H. J. Sweger, Duncan C. Stephens, 1164 Illuminating Bldg., 55 Public Square, SUperior 1-7000

Dallas 1.....Gordon Jones, John Grant, The Vaughan Bldg., 1712 Commerce St., Riverside 7-5117

Denver 2.....J. Patten, 1740 Broadway, ALpine 5-2981

Detroit 26.....H. J. Sweger, Jr., 856 Penobscot Bldg., WOodward 2-1793

Frankfurt/Main.....Stanley Kimes, 85 Westendstrasse, Germany

Geneva.....Michael R. Zeynel 2 Place du Port, Geneva, Switz.

Houston 25.....Gene Holland, W-724 Prudential Bldg., JAckson 6-1281

London E.C. 4...E. E. Schirmer, N. Murphy, McGraw-Hill House, 95 Farringdon St., England.

Los Angeles 17.....Robert Yocom, 1125 West Sixth St., HUntley 2-5450

New York 36.....Charles Haines, B. A. Johnson, P. E. McPherson, Charles F. Onasch, L. Charles Todaro, 500 5th Ave., OXford 5-5959

Philadelphia 3...William B. Hannum, Jr., 6 Penn Center Plaza, LOcust 8-4330

Pittsburgh 22.....Duncan C. Stephens, 4 Gateway Center, EXpress 1-1314

San Francisco 4.....William C. Woolston, 68 Post St., DOuglas 2-4600

St. Louis 8.....R. J. Claussen, 3615 Olive St., Continental Bldg., JEfferson 5-4867

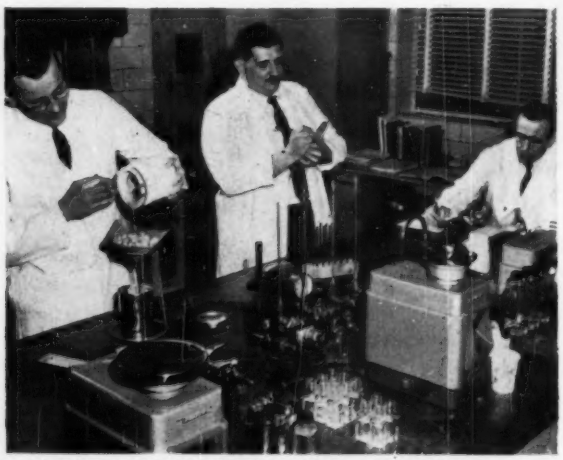
*For complete product data see catalog unit in the BUYERS' GUIDE ISSUE for 1959-60

WHAT'S NEWS IN CHEMICALS

BUTADIENE • A high purity diolefin, it gives top quality to latex paints. It fulfills the most rigid requirements for purity and uniformity . . . helps water emulsion paints roll on smoothly, evenly, and easily.

DICYCLOPENTADIENE • As an extender for drying oils in varnish manufacture, it reduces the cost of the finished product. As a modifier for semi-drying oils, it upgrades them by approaching drying oils in reaction and drying time.

METHYL ETHYL KETONE is a solvent used in the manufacture of many lacquers and shellacs. It assures durable surface coatings for fine furniture. Of high purity and low acidity, it provides maximum solvent power at minimum cost.



TECHNICAL ASSISTANCE • At the Enjay Buton testing laboratory the most modern equipment and methods are always at work to help customers in the solution of technical problems and new product applications.

ANOTHER FIRST FROM ENJAY FOR BETTER

ENJAY
PETROCHEMICALS

A new line of thermosetting polymers for better container coatings and countless other products now joins the family of chemical raw materials that Enjay offers the surface coatings industry. These new polymers – Buton Resins – were formerly called C-Oil and Butoxy Resins. They offer tough, high-quality coatings comparable to those obtained from higher-priced materials. Buton Resins may be cured by air dry – force dry cycles, low-temperature bakes, high-temperature bakes, or a new technique called flame curing. Flame curing produces the tough, chemically resistant finish 20 to 50 times faster than conventional bake cycles.

Buton Resins offer multiple advantages. They can be blended with ureas, melamines, short and medium oil alkyds, vinyls, phenolics and nitrocellulose to obtain specific properties. They provide adhesion on various substrata,

SURFACE COATINGS... BUTON* RESINS

high gloss, good pigment wetting and good corrosion and chemical resistance. Buton Resins can be used in primer formulations for appliances, automobiles, and all types of metals. They can also be formulated for use in container linings, finishes for furniture, wire coatings, etc. For technical assistance or to order any Enjay chemical, write or phone.

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EXCITING NEW PRODUCTS THROUGH PETRO-CHEMISTRY

ENJAY CHEMICAL COMPANY

A DIVISION OF HUMBLE OIL & REFINING COMPANY

ENJAY
PETROCHEMICALS

SCIENTIFIC DESIGN'S PROCESS SKILLS continue to make news

Here are some recent technical developments reported in the press

PETRO-TEX TO BUILD WORLD'S LARGEST MALEIC ANHYDRIDE PLANT

May 24—Scientific Design Company will design a 30,000,000 pound per year maleic anhydride plant using a new Petro-Tex process employing butene feedstocks and certain phases of SD's own process.

GOODYEAR TIRE AND RUBBER COMPANY TO PRODUCE 2 NEW SYNTHETIC RUBBERS

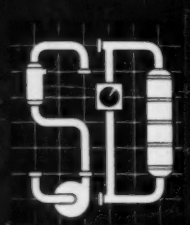
May 17—Scientific Design Company will design and engineer new polyisoprene and polybutadiene plants in Beaumont, Texas.

Phthalic Anhydride Producers Offered Raw Material Flexibility

June 6—Scientific Design Company announced a new catalyst which for the first time permits the use of ortho-xylene, naphthalene or any mixtures of both as raw materials.

SD-SW PROCESS MAKES SEA WATER FRESH

May 24—Scientific Design Company and Struthers Wells Corporation have successfully tested a new freezing process to produce fresh water. The process represents a major breakthrough in the production of large ice crystals through the controlled crystallization of sea water.



SCIENTIFIC DESIGN COMPANY, INC.

Leader in Design, Development, Construction of Chemical Plants

EXECUTIVE OFFICES: TWO PARK AVENUE, NEW YORK 16, NEW YORK

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